Tell the man who knows how to sell

OIL BURNER manufacturers who are looking for SELLING organizations to merchandise their product should tell their story to the refrigeration dealer. The substantial increase in refrigeration sales during this "depression year" is evidence in itself that refrigeration salesmen, dealers and distributors are aggressive in their selling activity. Giving full credit to effective advertising, national and local, the record of this year would not have been possible without the skillful and persistent effort of men thoroughly trained in modern methods of specialty selling.

But---a simple study of costs reveals this fact. The organization which is geared to do a major selling job when the biggest selling job can be done, must either sacrifice its profit or cut its personnel (or both) in the months when the seasonal trend is down. After building organizations and acquiring personnel which will meet the maximum possibilities of the peak selling season, many distributors and dealers are loath to reduce the scale of their operation. They are anxious, if possible, to maintain their sales force and to provide an attractive income for it and themselves during the entire twelve months of the year. One method of doing it is suggested in the preceding pages.

Here are four reasons why the refrigeration dealer finds appeal in the oil burner as an additional line:

1. It offers a means of maintaining sales volume over a greater portion of the year.
2. It provides additional employment for service and installation departments.
3. It is adapted to, and requires, specialty selling methods.
4. It is SOMETHING ELSE to be sold to the SATISFIED CUSTOMERS whose confidence the dealer already has gained.

To reach refrigeration dealers from the Atlantic to the Pacific, the oil burner manufacturer will find Electric Refrigeration News a direct and economical medium. Here, in the News, he can tell his story to men who KNOW HOW TO SELL.

F. W. BRACK, Advertising Manager

In Three Parts—Part 1

ELECTRIC REFRIGERATION NEWS

Registered U. S. Patent Office.

The business newspaper of the refrigeration industry

ISSUED EVERY TWO WEEKS
VOL. 5, NO. 3, SERIAL NO. 105

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DETROIT, MICHIGAN, OCTOBER 8, 1930

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UNIVERSITY OF CALIFORNIA LIBRARY BRANCH OF THE COLLEGE OF AGRICULTURE

MAJESTIC LINE PRODUCTION STARTS

COOPERATION HAILED BY BIG EXECUTIVES AS AIM OF INDUSTRY

Detroit A.S.R.E. Meeting Attracts Refrigeration's Leaders

Detroit, Mich.—The refrigeration industry sent its leaders to the front at the meeting held by the Detroit Section of the American Society of Refrigerating Engineers at the Hotel Statler on October 6th. With one or two exceptions the chief executives of the major companies in the industry accepted the invitation of the Detroit engineers to get together and talk on "Selling Refrigeration." Both ice and mechanical refrigeration were represented on the program.

The galaxy of stars announced by George B. Bright in charge of the meeting, and Glen Muffly, president of the Detroit Section, attracted the biggest crowd that ever turned up for an A. S. R. E. meeting here. More than 300 were present for the dinner and about 250 more crowded into the banquet hall when the speechmaking began.

George T. Mason

George T. Mason, president of Kelvinator, was in the chair, and his introductions of the various speakers were as great a contribution to the "get together" spirit that pervaded the meeting as any of the scheduled speeches. Most of the men whom he introduced were his direct competitors, but Mr. Mason gracefully described the standing and accomplishments of each man in a fashion that won for him the esteem and applause of every man in the big room.

Harry D. Edwards

First on the long list was Harry D. Edwards, president of the A. S. R. E., who made a special trip from New York to welcome the distinguished guests in the name of the Society, to express his hopes for the furtherance of coöperation throughout the industry, and to urge the advantages of membership in the organization of which he is the head.

H. W. Burritt

H. W. Burritt, vice-president in charge of sales of Kelvinator, followed Mr. Edwards, and spoke on Ethical Trade Relations. Because of the fact that he heads the recently formed committee of the ice and mechanical refrigeration industries, which is endeavoring to eliminate objectionable practices, Mr. Burritt was especially well qualified to discuss the subject assigned to him. He spoke of an occasion a few years ago when he was invited to talk to the ice dealers' national association, and recalled that such a talk was considered almost revolutionary at that time. He traced the steps that led to the formation of the present coöperative committee, pointing out as he did so that the present competition was a competition between industries for a fair share of the consumer's dollar, leaving no time for private quarrels within the refrigeration industry. He pledged his committee to the task of eliminating from both ice and mechanical advertising and sales promotion "all negative or derogatory" material. In closing he said: "I can see the time not far distant when you will see in every locality the ice, mechanical and ice box interests banded together and campaigning constructively to advance refrigeration for the benefit of all."

T. K. Quinn

T. K. Quinn, manager of the electric refrigeration department of the General Electric Company, who had flown up from Cleveland, was introduced as "a man who has done an outstanding selling job this year." The Problem of the Salesman was his assigned topic, and he began by inquiring with feigned innocence whether it meant the salesman as a problem to his employer, or the problem that the salesman has to solve. Receiving no reply to his question but appreciative laughter, he announced that he would talk from both viewpoints.

Mr. Quinn rather startled his audience by stating flatly that he was glad that the industry was young because the salesmen who started in it didn't have so much to unlearn. He continued

(Continued on Page 4, Column 1)

READY FOR BATTLE

Chicago, Ill.—All has been quiet on the middle Western front during the last three months, but preparations for a continuation of hostilities in the Chicago City Council over the proposed refrigeration code can be seen around the City Hall. It is understood the code question will be brought up at the first meeting of the Council in November.

Gerald F. Gearon, of the Boiler Inspection Department, has a draft for an ordinance, and Dr. Arnold H. Kegel, health commissioner, also is lining up his forces.

The Two Rs

IT is fitting that the Buyer's Guide which is part of this issue of Electric Refrigeration News should be devoted to the tie-up between Radio and Refrigeration. When it was planned there was no thought that the beginning of Majestic's actual line production would coincide with it, but the coincidence only serves to emphasize the bond between the two industries that is continually being strengthened.

Stated Prices of $175 and $195 Put Unit in Quality Group

AFTER almost a year of piling rumor upon rumor, a job that was done most effectively if it was done intentionally, the Majestic refrigerator has at last emerged into the public view. With it has come an announcement that the 5 cubic foot model will sell for $175 f. o. b. factory, and the 7-foot unit for $195 f. o. b. factory.

This price schedule effectively ends the career of the most healthy and prominent of all the rumors that have clustered around the original announcement of the Grigsby-Grunow Company that it intended to enter the refrigeration field. Based either on something or nothing, probably on the fact that Grigsby-Grunow cut a wide swath through the radio field with a low-priced unit, the refrigeration industry has been expecting a cheap refrigerator from Majestic. All sorts of prices have been talked of, practically all of them being under $150, and some predictions have been made that the new Majestic would sell for less than $100.

The announced prices put the Majestic safely in the "quality group" in the refrigeration fold.

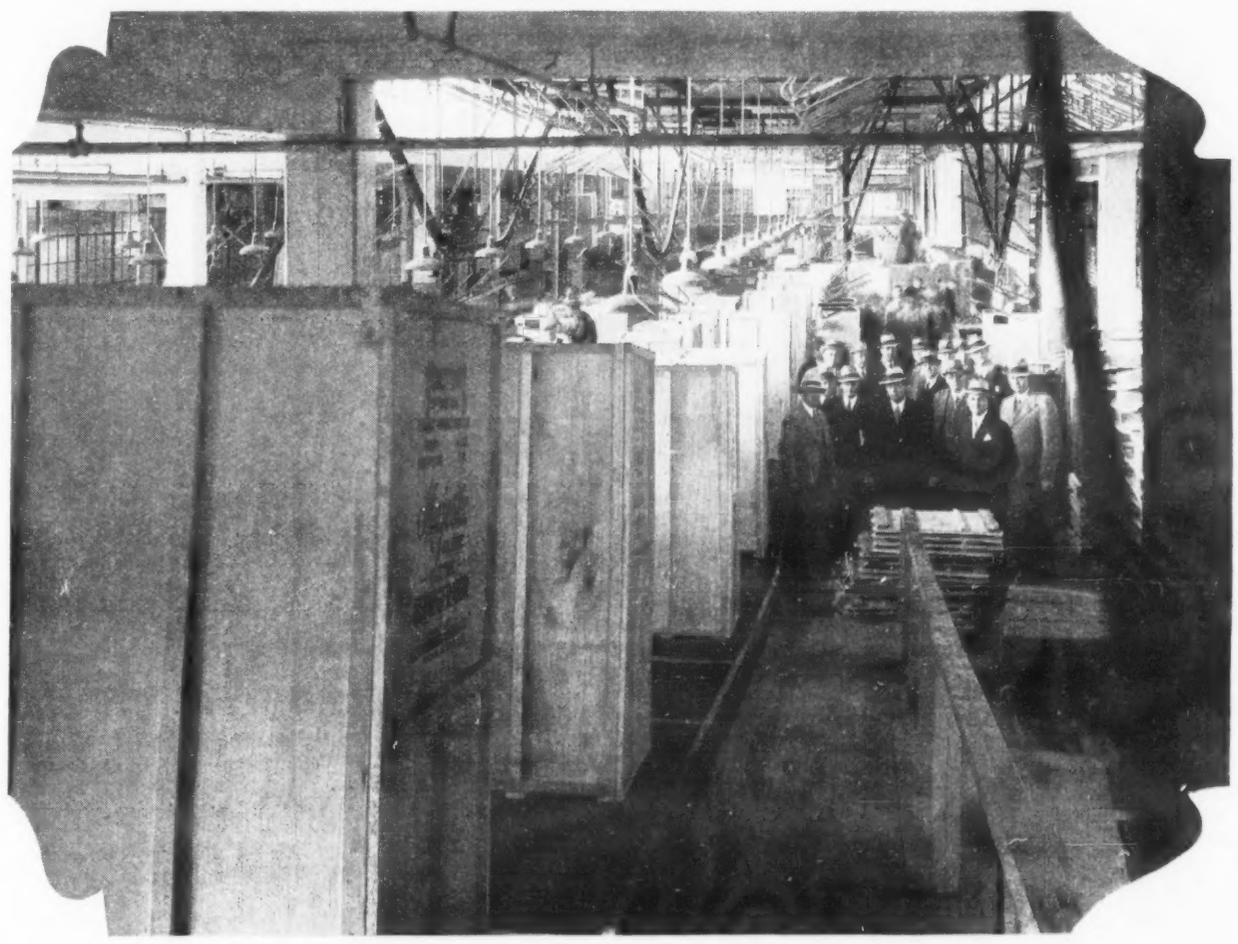
In its brief history, the refrigeration industry has experienced no other period of anxious excitement comparable to that which began late in 1929, when it became known that Grigsby-Grunow intended to build refrigerators. Wherever two or three refrigeration men have gathered together in the meantime, the conversation has been certain to veer around to Majestic's plans, and when that state of mind exists in an industry, a splendid crop of rumors is the inevitable result. The situation has paralleled, on a smaller scale, the disturbance created in the automobile industry by the announcement a couple of years ago that Ford intended to bring out a new model.

For several months after the first Grigsby-Grunow announcement, refrigeration manufacturers practically held their breath while waiting to hear more. Statements of their plans from officials of the Grigsby-Grunow organization promised that the period of waiting would not be long. It was known, for example, that W. C. Grunow spent the winter with a refrigerator in Arizona. The construction of new factory buildings began almost immediately. Production by the second week of May was the first official prediction, but when the second week in May came around, August was set as the time for beginning real operations. August came and went, with rumors becoming increasingly thick, and as told in another column, production really got under way in the newly-built Chicago plant on the last day of September.

When it became evident that the Majestic units would be greatly delayed, the refrigeration industry ceased its watchful waiting policy, and began to take full advantage of that delay. As recorded from time to time in the NEWS, refrigeration manufacturers have brought out low-priced units during the last few months, and by so doing have placed Majestic in the upper price levels. Whether done with deliberate design or

(Concluded on Page 19, Column 1)

They're Off



W. C. Grunow, in center of group, watches the first refrigerator depart.

FIRST MAJESTIC CARLOAD GETS SPLENDID SENDOFF

Chicago, Ill.—A bottle of champagne, wielded by W. C. Grunow, crashed and splashed against the side of a red box-car on a siding at the Majestic Household Utilities Corporation factory, here, on the last day of September. That official act marked the beginning of line production of Majestic refrigerators.

Thousands of Majestic dealers, together with the entire electric refrigeration industry, have been awaiting the announcement that the Majestic refrigerator was ready for the market. For months rumors of all sizes and descriptions have been floating around the country about prices, sizes, nature of the unit, and production quantities.

In the last issue of the NEWS another current and officially inspired rumor was printed, to the effect that Majestic was producing 1,000 refrigerators per day at that time. From reliable sources it has been learned that probably less than 200 units were built up until September 30, when line production started.

Proceeding carefully and making sure that every piece of work is done exactly according to specifications, Majestic engineers will probably limit production to small quantities for a short time. The thousand-per-day rate is expected to become a fact soon, with a speed of 4,000 machines daily as the ultimate goal.

The cabinet, which is remarkably like a phonograph in style, is made entirely of steel, finished in white enamel. The food compartment is also of steel, coated with vitreous enamel. No hooks are used to support the shelves, which are held up by rounded knobs that make for ease in cleaning. A combination of fibreboard and "Dry Zero," three inches thick, gives insulation.

The cold unit, or heat absorption coils, enclose two freezing compartments of the same size. The upper one holds two trays, each with a capacity of 21 ice cubes. With separators in place, the tray in the lower compartment provides 42 more cubes. With separators removed, it gives generous space for frozen desserts or the new packages of quick-frozen foods now being marketed, which may here be kept indefinitely.

A rotary type pump is driven directly from the motor. Motor and compressor are hermetically sealed into a pressed steel "bell-housing." The resulting unit is so compact that it is only 9½ in. in height, and is therefore readily placed in the space above the food compartment yet below the lid.

In depth over all, both models are the same, 27 13/16 in.; in the larger machine the height is 59 in. and the width 33 11/16 in., while the smaller model is 54⅝ in. in height and 28½ in. in width.

Sulphur dioxide is the refrigerant. Other features are a brass evaporator,

(Concluded on Page 19, Column 2)

COPELAND ADDS NAMES TO LIST OF DIRECTORS

Mt. Clemens, Mich.—William Robert Wilson, chairman of the board, Copeland Products, Inc., has announced that J. C. Cuppia and A. L. Melhado, both of E. A. Pierce & Co., New York City, were elected to the board of directors at the regular meeting held in Mt. Clemens, September 26.

The complete board is now as follows: Edwin W. Atwood, Flint; Edwin H. Brown and Henry T. Cole, Detroit; J. C. Cuppia, New York; Paul H. Deming, Detroit; A. L. Melhado, New York; C. Wilbur Miller, Baltimore; Dr. Fred T. Murphy, Louis Ruthenburg, Carleton S. Smith, Merlin Wiley and William Robert Wilson, chairman, Detroit.

SERVICEMEN PERFECTING NATIONAL ORGANIZATION

Buffalo, N. Y.—The organization of the National Society of Refrigeration Service Engineers is progressing satisfactorily, and each week brings in letters from servicemen in all parts of the country. Information regarding the formation of local chapters has been requested by servicemen in Chicago, Milwaukee, Bethlehem, Pa., Philadelphia, Evansville, Ind., Montreal and Pensacola. As stated in the September 24th issue of ELECTRIC REFRIGERATION NEWS, ten members will be permitted to form a chapter.

Milton Boneberg, president of the society, is working out plans for extending the new organization's educational activities, and is considering the establishment of an open forum in which servicemen can exchange views and experiences.

Printed application blanks have been prepared and are being mailed out to all who write in asking for information. Letters regarding the society should be sent to Mr. Boneberg at 67 Peach Street, Buffalo, New York.

AUTUMN G. E. CONFERENCES

Cleveland, Ohio. — Sales promotion managers of the distributor organization of the electric refrigeration department, General Electric Company, will hold their annual fall conference at Refrigeration Institute, Cleveland, October 27, 28 and 29, according to announcement made by Walter J. Daily, head of the sales promotion division of the refrigeration department.

A conference for home service directors of distributor companies is scheduled for October 30 and 31, at Refrigeration Institute here.

BUILDERS SEEK REVISION OF WASHINGTON, D.C., CODE

Washington, D. C.—A public hearing to discuss and, if possible, eliminate "practical difficulties" in the code regulating the installation of mechanical refrigeration in the District of Columbia has been requested of the Board of Commissioners of this city by the Operative Builders' Association.

Rufus S. Lusk, executive secretary of the association, said the code recently adopted by the commissioners had virtually prohibited the installation of multiple systems in this city.

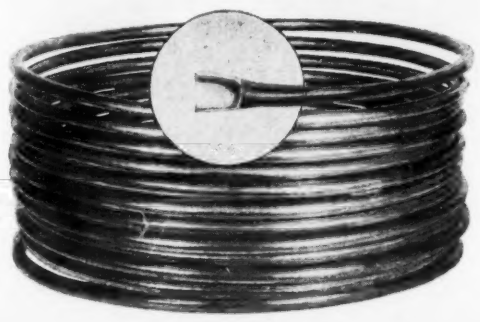
"The greatly increased cost and practical difficulties of complying with the code as written" Lusk said, "prevents the installation of the multiple type of refrigeration. While some builders prefer unit installation of refrigeration, a number of builders and owners prefer and have found in practice that the multiple system is very satisfactory and that they wish to continue it."

The petition filed with the commissioners by Lusk cited as an example of

(Concluded on Page 2, Column 4)

DEHYDRATED WOLVERINE SEAMLESS COPPER TUBING

Highest quality seamless copper tubing—perfectly dehydrated and solder-sealed—made to A. S. T. M. Specifications (B-68-30-T)—ready for quick installation. Send your production requirements for quotations, or wire for rush shipment from stock.



WOLVERINE TUBE CO.

SEAMLESS COPPER BRASS & ALUMINUM

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Export Department—H. M. Rolins Company. 120 Madison Avenue, Detroit, U. S. A. *Cable Address:* Robns. Detroit

Sales offices in all major cities. Stock available at Los Angeles, 224 E. 11th St. Write or wire for name of nearest representative.

QUINCY SALES CREW TAKES REFRIGERATOR FOR A RIDE

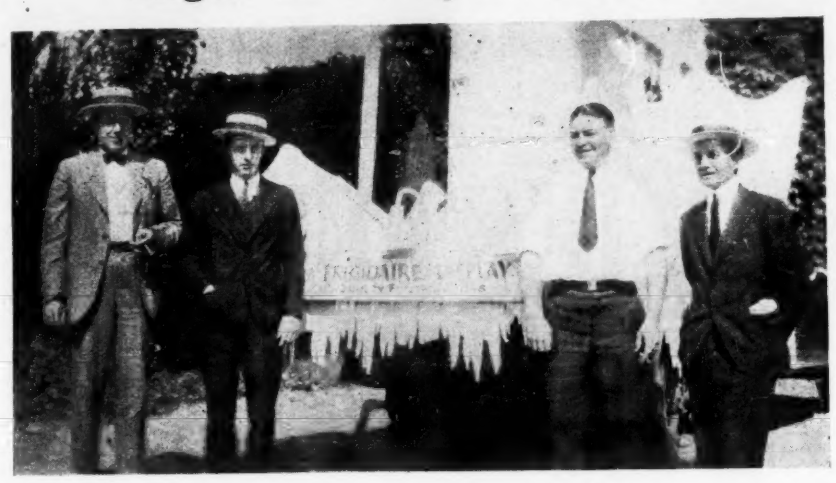
Quincy, Mass.—Taking Frigidaire to the prospect by means of a traveling display has had much to do in promoting the sale of electric refrigeration by the Quincy Electric Light & Power Company. With the aid of the Home Electric Light & Power Co., Boston, Frigidaire distributors, who furnished the truck, a novel display was rigged out. To emphasize the idea of refrigeration, the truck was attractively decorated in a North Pole motif, done in papier-mache, the center of interest being a new porcelain model Frigidaire. To add realism, the Quincy men installed a Delco system on the vehicle so that the Frigidaire in its travels about town had the job of making ice cubes.

The gaily decorated truck with its load of refrigeration was piloted by its crew through the town. Stops were made at all fire stations in the Quincy district, so that the smoke-eaters might become better acquainted with the conveniences of electric refrigeration. The fire companies, from the chief down, were made to forget the business of fire fighting for a moment while the crew demonstrated the Frigidaire. The Quincy salesmen realized that the firemen on day shift were unable to get around much, so as a result two orders for Frigidaires were traced directly to this effort.

Another stunt was to stop the truck in front of motion picture houses just as the crowds were going in. One fast sale was negotiated one day as the result of a drive on a street where a number of children were playing. One of the youngsters was heard to say, "Oh, there goes Frigidaire. My mother was thinking of getting one of them." One jump and a live-wire salesman was down from the truck to seize the golden opportunity. He found out where the youngster lived and soon was telling the housewife his story. He met with success and a signed order was in his pocket as he emerged from that home.

In the picture, four employes of the Quincy Electric Light & Power Company are standing near the traveling display. Reading from left to right: A. P. Fletcher, head refrigerator salesman; Joseph Birch, Frank Merna, installation department, and C. R. Sawyer.

Right to Prospect's Door



The wandering Frigidaire with its guardians

CODE REVISION SOUGHT BY WASHINGTON BUILDERS

(Concluded from Page 1, Column 5)

the practical difficulties of the code a requirement that "every evaporating unit or part in contact with the refrigerant be sufficiently rugged to turn the end of an ice pick." Because of the cost, Lusk said, it is almost impossible to comply with this provision of the code.

Lusk said that most of the refrigerating machinery installed in the District of Columbia since July 1, when the new code went into effect, was installed in violation of this regulation.

The Operative Builders' Association requested the hearing "for the purpose of drafting a set of regulations which will provide ample safety and at the same time permit the continued installation of multiple systems."

After receiving the petition of the builders, Major John C. Gotwals, Engineer Commissioner of the District of Columbia, announced that it would be studied by Major Donald A. Davison, assistant engineer commissioner, who also is studying an earlier complaint made by manufacturers of one multiple type machine.

Major Gotwals, who only recently took up his duties here, said he was not familiar with the situation, but Major Davison was. He said he would await a report from Major Davison before announcing whether or not there would be another hearing.

Major Davison said the same objections now being made to the code as it relates to multiple unit installations were made at the public hearing held here early this year, but that the commissioners had decided the interests of public safety required extreme strictness.

The subject chiefly in issue, he said, was the requirement that two tubes must be provided for carrying the refrigerant gases, one inside the other. This Major Davison described as one of the cardinal features of the code, and said he would be strongly opposed to any modification.

Washington now has the model refrigeration code of the country, Major Davison said, and it would be maintained with all possible strictness.

Major Davison admitted that some installations made here since July 1 do not comply with the provisions of the code. This is because plans for those installations were already on file before July 1, and the passage of the code could not affect them, he said. The provisions of the code will be rigidly enforced on all installations the plans for which were filed after July 1, he said.

GETS TRIP TO DETROIT FOR ONLY 66 SALES

Detroit, Mich.—H. M. Osmun, salesman of the New Jersey Power & Light Co., by selling 66 Kelvinators during a six-week period, achieved the selling championship of the Associated Gas & Electric System's Refrigeration Jubilee.

In addition to many prizes he received, Mr. Osmun was awarded a free trip to the Kelvinator factory and spent several days as the guest of the corporation during the week of September 21.

Mr. Osmun entered the employ of the New Jersey Power & Light Co. a few days after the Jubilee opened, and was assigned to Netcong, a small town considered not a very fertile field. He dug in and proved that the sympathy given him for drawing "tough territory" was wasted. He averaged 25 to 30 calls a day and sold eight refrigerators the first week, seven the second, and in six weeks 66, an average of eleven per week.

Mr. Osmun has been promoted to supervisor and his group of salesmen have been at the top of the list since he took charge.

A. Sherman, of the Elmira Light & Railroad Co., Elmira, N. Y., was the runner-up in the Jubilee campaign with a record of 56 Kelvinator sales. He, too, has been appropriately rewarded with prizes and honors.

Mr. Sherman spent three years installing and servicing Kelvinators. His work in the Refrigeration Jubilee Campaign was his first experience in selling. He made most of his sales at night, when the husband and wife were both at home, but did not confine himself to night work. He made many daytime sales.

BRONX MEN CAPTURE REX COLE HONORS

New York, N. Y.—Celebrating their triumph in the Retail Baseball League Sales Contest, staged during the month of August, members of the Bronx Retail Division of Rex Cole, Inc., were guests at a Victory dinner, held recently at the Concourse Plaza.

Rex Cole, metropolitan distributor for General Electric refrigerators; A. A. Uhalt, Electric Refrigeration Department of Cleveland, and other officials of Rex Cole, Inc., were honor guests at the dinner. Wm. J. Clark, sales director, acted as chairman of the dinner meeting.

CONTRIBUTOR TO NEWS IS DEAD

Hanover, N. H.—Richard C. Hay was killed in an automobile accident at Charlemont, Mass., while en route to this city. He had recently been appointed professor and was on his way to Hanover for the fall term of the Tuck School of Finance at Dartmouth College.

Mr. Hay contributed several articles on the "standard sales presentation," which appeared in the NEWS a short time ago.

ELECTRO-KOLD GETS CONTRACT

Seattle, Wash.—Electro-Kolds will be placed in the new Dixonian Apartment building being constructed at 1133 Seventh Avenue, Seattle. The Dixonian Investment Company has named the Electro-Kold Corporation, of 2214 Fourth Avenue, Seattle, to handle the installation.

3300

DEALERS AND SALESMEN VISITED THE HOME OF WILLIAMS

ICE-O-MATIC

WILLIAMS sixth international convention at the Ice-O-Matic factory in Bloomington brought more than 3300 dealers and salesmen together. They rubbed elbows with refrigeration men from every American state and Canadian province, and from countries abroad.

We'd like to show you this greatest gathering, the crowds, the exhibits, the cut-away models, the sensational "Ferris-wheel" Ice-O-Matic which refrigerated as it spun round and round. We'd like to show you the complete line of Ice-O-Matic Capitol sealed units and the larger Model A compressors and the commercial units. With all the information on your desk, you could *see* why you can make more money this year with Williams Ice-O-Matic. A postal card, a letter or a wire will bring you all the facts that led outstanding merchandisers to secure this valuable franchise.

Ice-O-Matic Division

WILLIAMS OIL-O-MATIC HEATING CORPORATION

Bloomington, Illinois

LISTEN TO WILLIAMS PROGRAMS—Sunday evening at 7:30 Eastern Time over NBC Blue Network.

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DESIGNERS of refrigerator door gasket. An organization with a background of refrigerator manufacturing experience. Essentially gasket manufacturers, we are capable of solving all your gasket problems.

Wirfs PATENTED

AIRTITE" GASKET

is made in five standard sizes. For the manufacturer requiring a special type, we offer the services and experience of an organization devoted exclusively to door gasket manufacturing.

Let us work from your blueprints.

DEALERS in electric refrigeration have many occasions to use "AIRTITE" Gasket. Write for samples and prices.

WIRFS CORPORATION

135 S. 17th St. St. Louis, Mo.

Your prospect's pocketbook

IS PLENTY BIG ENOUGH for a General Electric REFRIGERATOR

No matter *what* the prospect's income may be, you can prove it big enough to buy a General Electric Refrigerator this very day.

You have such easy terms to offer, that a few dollars in cash will take care of the first small payment. And cost of operation is but a few cents a day.

Show your prospects that the General Electric Refrigerator not only *saves* them money, but that it *earns* money as well. By preventing waste and spoilage of food, it earns money. By supplying ice cubes, by making delicious, inexpensive frozen desserts, by keeping milk and cream from souring, green vegetables from wilting—by making it possible to buy foods in larger quantities when prices are right—it *earns* money.

When prospects are shown that they can trim expenses and live better on smaller budgets, they are *interested* in a General Electric Refrigerator. And our increase in sales shows *they buy!*

GENERAL ELECTRIC

ALL-STEEL REFRIGERATOR

ELECTRIC WATER COOLERS COMMERCIAL REFRIGERATORS ELECTRIC MILK COOLERS

Join us in the General Electric Hour, broadcast every Saturday evening at 9 o'clock, Eastern Standard Time, over a nation-wide N. B. C. network.

ELECTRIC REFRIGERATION DEPT., GENERAL ELECTRIC CO., HANNA BUILDING, 1400 EUCLID AVENUE, CLEVELAND, OHIO

REFRIGERATION LEADERS ADVOCATE COOPERATION

(Continued from Page 1, Column 1)

that the salesman's greatest problem was the problem of himself, and indicated that the man who couldn't understand himself and his own capabilities would have a hard job selling to others. He then took the industry to task for its failures and backwardness on a number of vital points.

"Salesmen are poorly trained," he said, "and we are to blame. They are not compensated as intelligently as they should be. The industry is still unsound. It cannot yet guarantee that each factor in it will make a profit. And everybody, manufacturer, distributor, dealer and salesman, should be able to make a profit if the industry is to endure."

After reading a paragraph from President Hoover's Boston speech, Mr. Quinn referred briefly to the present state of the industry, saying that although there had been shifts in sales volume and other factors within the industry, the mechanical refrigeration industry as a whole is ahead of 1929 for the nine months ending September 30th, a notable achievement in a year like this.

There was a gap in the schedule at this point because of the absence of E. G. Biechler, president of Frigidaire. Mr. Biechler had intended to be present, Mr. Mason explained, and had made a reservation on the afternoon plane, but at the last moment was forced to cancel it.

H. D. Norvell

Then came one of the high spots of the evening when H. D. Norvell, president of the City Ice & Fuel Company, with its headquarters in Cleveland and branches in more than a score of states. Mr. Mason introduced Mr. Norvell as the "grandfather of the refrigeration industry," tracing his long career from the boyhood days, when he peddled ice from a hand-cart in Jersey City, on up through the time when he had a team and called upon the high class saloon trade, to his present position as head of an ice company so firmly established that it finds the railroads willing to make twenty-five year contracts with it for the icing of refrigerator cars.

The entire audience rose in tribute as Mr. Norvell stepped forward and began a series of seemingly careless but cogent remarks that proved the big hit of the meeting. He didn't have to say much to fill his allotted time because he kept the crowd in a storm of laughter with his brief and pithy sentences, and had plenty of time to rest between remarks while his listeners were quieting down. Addressing those before him as "scientists," he declared that ice was going to last just as long as it proved fashionable, and no longer; that he deplored the existence of radicals in both the ice and mechanical refrigeration branches of the industry, but supposed that, men being what they are, the radicals would have to be tolerated. He emphatically refused to become excited over the inroads mechanical refrigeration is making into the ice business, and declared that he had been convinced against his will that there was a place for mechanical refrigeration. That place he forebore to mention, but left his hearers in no doubt as to its exact location.

Speaking more seriously of the progress made by his own company to which Mr. Mason had referred in such flattering terms, Mr. Norvell gave a hint of his business philosophy. Decrying conflict, he stated that his organization had expanded entirely by buying its way into the communities in which it now operated. It never has fought its way in, and Mr. Norvell attributed much of its present recognized position to that policy. When he had finished, Mr. Norvell asked the audience the best way to get back to Cleveland, listened to a host of suggestions from all over the room, and finally decided he would take the boat.

V. E. Vining

The most aggressive speech of the evening came next. V. E. Vining, sales manager of Servel, taking the place of Col. F. E. Smith, who was unable to attend. Mr. Vining, known throughout the industry as "Sam," had Winter Selling as his topic. In rapid fire fashion he pounded home his theories. He attacked some of the sales methods now in general use, declaring that indiscriminate door-bell pushing is wasteful and is vastly increasing the cost of sales. He emphasized the fact that a few dollars saved here and there by the engineers in the course of production, is only a drop in the bucket to the savings that should be made in sales expense by the adoption of more selective methods of finding prospects. Mr. Vining disdained to call them "Prospects." According to him, "suspect" is the proper word.

He advised his audience to "look for the man who isn't spending his own money if you want to sell refrigerators in the winter time," and amplified this cryptic remark by pointing out that the architect, the management corporation, and others in similar positions are the men to go after. He insisted that more selective sales methods should be used at all times, but especially in the off months, and deplored the tendency of the industry to use the same sales methods the year-round. By the time Mr. Vining sat down, those in the hall knew that remarkable as the sales record of the refrigeration industry is, there is at least one man in an important position who knows that it can be made a great deal better.

Louis Ruthenburg

Louis Ruthenburg, president of Copeland, and introduced as a recent importation from the automobile industry, spoke on Flattening the Sales Curve. He proved his training in the automobile business by showing how that industry uses statistics to study itself. He pointed out the factors which should be known in order to evaluate present trends, and indicated the studies that an outsider, "a man from Mars" as he put it, would have to make in order to discover how improvements could be made in the industry's rather erratic sales curve. He showed how his "man from Mars" would have to use other older industries in order to study the refrigeration industry properly. Stating that the automobile industry in the last quarter century had gone through three distinct phases in its development, he declared that the refrigeration industry is just going into the second phase. It has passed the pioneering stage, and has reached a period in which rapid growth will result from the general spread of information in regard to refrigeration.

Mr. Ruthenburg showed how the automobile industry had flattened its usage curve in advance of the flattening of its sales curve, and referred to the same process in the radio industry, although not as effectively done. He then pointed out that the refrigeration industry starts out with a product that is used 365 days in the year, that it does not have to educate the public to use its product throughout the year as the automobile and radio industries did. "One trouble that does exist," he said, "is that the public is still ice-minded. The average housewife follows her old habit of thinking and refuses to buy refrigeration when the weather grows cold. There is a distinct conflict between the thinking of the prospect and the habit of the user."

Mr. Ruthenburg closed with a forceful plea to the refrigeration industry to get together and present a united front. He praised the work that has been accomplished in the last six months, and expressed the hope that coöperation would steadily increase.

Walter Seeger

Representing the cabinet manufacturing branch of refrigeration, Walter Seeger, president of the Seeger Refrigerator Company of St. Paul, talked on Quality. His products are sold both to the ice manufacturer and to the electric refrigeration manufacturer, so he has an excellent opportunity to hear all sides of debated questions. "This summer we have just gone through," he said, "remarkable for its combination of heat and humidity, put an emphasis on quality that should be a lesson to us all."

A. J. Authenrieth

A. J. Authenrieth, vice-president of the Middle West Utilities of Chicago, then spoke on What of the Future? He reviewed the meteoric rise of refrigeration in the last few years, and declared that it now has a place in the consciousness of the nation. He said that he saw nothing in sight that would retard the further progress of the industry, and referred briefly to some of the newer developments in refrigeration that are gaining in public favor. He mentioned specifically the newer methods of car icing, room cooling, and "those two remarkable twins, dry ice and quick-freezing, the babies of the industry."

George Cusack

George Cusack, in charge of sales for the Dry Ice Corporation of America, came next. He talked of the pioneering work that had to be done in developing his company's products, of the dire predictions that were made, and said that in 1928 the corner was turned and since that time the company had been operating at a profit, selling dry ice at five cents per pound from headquarters in 26 cities.

Leslie Smith

Last on the program was Leslie Smith, secretary of the National Association of Ice Industries, who fittingly spoke on the duty that the entire industry owes to the American public. He urged that all misrepresentation and untruths be eliminated from the thought and action of the industry, and prophesied that the meeting at which he was speaking was only the first step in a forward movement that would be of benefit, first to the nation, and then to the united industry.

James J. Davin

As soon as Mr. Smith had finished, J. J. Davin, in charge of sales promotion for Majestic, was introduced and welcomed into the industry by Mr. Mason. Mr. Davin responded briefly, and promised that Majestic, in its position as the baby of the industry, would do its best to advance the movement for coöperation, and would do all in its power to make the refrigeration industry proud of its new member.

When Mr. Davin sat down, the chairman expressed, on behalf of those present, appreciation of the work that Mr. Bright and Mr. Muffly had done in arranging the meeting, and then declared the session adjourned. Those at the dinner were:

A

Harry A. Abrahamson, Detroit Majestic, Detroit; F. M. Alexander, Jr., Kelvinator, Detroit.

B

C. J. Baker, Maxon, Inc., Detroit; M. C. Baker, Parker Rust Proof Co., Detroit; H. B. Barber, Kelvinator, Plymouth, Detroit; Edw. Barger, Copeland, Mt. Clemens, Mich.;! G. W. Barkeley, Belding-Hall, Belding, Mich.; D. G. Ballas, Frigidaire, Detroit; J. S. Beattie, C. F. Belshaw, Detroit; O. E. Bender, Detroit; Carl M. Berry, Majestic, Cleveland; Richard D. Billby, Frigidaire, Detroit; H. R. Bilbrey, General Electric, Detroit; Howard E. Blood, Norge, Detroit; Chas. E. Blue, Lipman, Detroit; A. L. Bogell, Grenell Adv., Detroit; R. E. Boni, Kelvinator, Detroit; E. A. Bonneville, Detroit; H. A. Bonsteel, J. W. Greene Co., Westinghouse, Toledo; Jacob Borin, Borin Bros., Detroit; Max Borin, Borin Bros., Detroit; Nathan Borin, Borin Bros., Detroit; C. A. Brangham, Newton Steel, Detroit; Roger K. Braun, Kelvinator, Detroit; M. S. Brenon, Maxon, Inc., Detroit; Chas. W. Brooke, Brooke, Smith & French, Detroit; C. M. Brown, Gibson Refrigerator, Greenville, Mich.; John V. Brumbaugh, J. W. Greene Co., Toledo; Henri A. Brysselbout, Copeland, Detroit; E. W. Birnhard, L. H. Gilman Co., Detroit; W. W. Burden, Witte & Burden, Detroit; C. W. Burns, Hydro Electric Power Commission, Walkerville, Ont.; T. C. Burnside, Detroit.

C

C. V. Calkins, Kelvinator, Detroit; C. J. Camp, Copeland, Detroit; E. A. Casaroll, Automobile Shippers, Detroit; F. F. Carson, General Electric, Detroit; R. P. Champney, Mitchell & Smith, Detroit; E. G. Charter, Copeland, Detroit; F. M. Cockrell, Electric Refrigeration News, Detroit; Chas. E. Collier, Pictorial Review, Chicago; J. D. Colyer, Wolverine Tube, Detroit; F. M. Conroy, Kelvinator, Detroit; R. G. Copeman, Copeman Laboratories, Flint; C. W. Coye, Alaska, Muskegon, Mich.; W. O. Crabtree, Tuckahoe, N. Y.; J. W. Crashley, Electrolux, Detroit; H. L. Crawford, Kelvinator, Detroit; E. L. Croft, City Service & Fuel, Cleveland; J. Robert Crouse, Kelvinator, Cleveland; R. L. Curriston, Leonard, Grand Rapids, Mich.; Albert Curry, Harry Bros. Mfg., Detroit; Geo. C. Cusack, Dry Ice Corp., New York.

D

J. J. Davin, Majestic, Chicago; R. A. Day, Kelvinator, Detroit; F. A. Delano, Grigsby-Grunow, Chicago; R. E. Densmore, Norge, Detroit; J. C. DeRemer, Frigidaire, Detroit; W. C. Dever, Whitehead & Kales, River Rouge, Mich.; R. W. Doeg, Kelvinator, Detroit; Robert C. Doremus, George B. Bright Co., Detroit; Ralph M. Douglas, Copeland, Mt. Clemens, Mich.; E. B. Downer, Frigidaire, Detroit; J. A. Drake, Norge, Detroit; Morrill Dunn, McCord, Detroit; W. L. Durhamer, McCormick George, Detroit.

E

Harry G. Eaken, Baldwin Stove, Cleveland; H. D. Edwards, A. C. Ellerbusch, Frigidaire, Detroit; D. G. Ellis, Kelvinator, Detroit; F. Erbach, Kelvinator, Detroit; Wm. G. Euth, Euth Lambrecht, Detroit; G. E. Evans, Copeland, Detroit.

F

P. E. Fay, Dry Ice, Detroit; Chas. Fitz Gerald, Frigidaire, Detroit; P. E. Flatron, Mitchel-Smith, Detroit; A. D. Fouger, Peninsula Stove, Detroit; C. L Fossati, Willys Export, Norge Export, Toledo; G. J. Fossati, Exporter's Translation Service, Temperance, Mich.; Willard S. French, Brooke, Smith & French, Detroit; A. V. Trolmapel, Kelvinator, Detroit.

G

Brackett Gardner, Absopure, Detroit; Hugh B. Gavigan, Frigidaire, Detroit; Chas. J. Gibson, Greenville, Mich.; Frank S. Gibson, Jr., Gibson, Greenville, Mich.; Whitney Giffard, Kelvinator, Detroit; J. L. Gillard, Alaska, Muskegon, Mich.; R. A. Girvin, Pittmans & Dean, Detroit; M. E. Golomb, J. A. Williams & Co., Pittsburg; M. J. Goulooze, Leonard, Grand Rapids, Mich.; Harry B. Graham, Copeland, Detroit; R. H. Graham, Copeland, W. Grand Blvd. and 12th, Detroit; Glenn Grinold, Lansing Ice & Fuel, Lansing; Everett N. Guild, Copeland, Mt. Clemens, Mich.; H. G. Grumaraes, H. K. Gustin, Alcona & Alpena Milk Corp., Alpena, Mich.

H

C. W. Hadden, Copeland, Mt. Clemens, Mich.; E. B. Hallihan, Westinghouse, Detroit; D. W. Hamilton, Belding-Hall, Belding, Mich.; J. Hardcastle, Castile Mfg., Flint, Mich.; Everett Haynes, Frigidaire, Royal Oak, Mich.; E. G. Heston, Frigidaire, Detroit; Hayden N. Hill, Kelvinator; O. J. Hinger, Copeland, E. Cleveland; Walter Hintz, Boun Bros., Detroit; M. B. Hoagland, Detroit City Service, Detroit; W. A. Honer, City Consumers Ice, Jackson, Mich.; L. H. Hontoon, Kelvinator, Detroit; H. J. Hooks, Wolverine Tube Co., Detroit; A. H. Hooper, Detroit; L. L. Hosier, Mayson Mfg., Detroit; E. E. Hubacker, Norge, Detroit; W. H. Huchthausen, Frigidaire, Detroit; Theo. Huetteman, Detroit Ice Machine, Detroit; B. G. Hyatt, Copeland, Detroit.

J

W. Jabine, Electric Refrigeration News, Detroit; F. W. Jennison, Bay City Freezer, Bay City, Mich.; Forrest E. Jernberg, Zerozone, Chicago; Lester T. Johnson, J. L. Hudson, Detroit; H. E. Jones, Kelvinator, Detroit; Mario Juares, Willys Export, Toledo, Ohio.

K

N. A. Kessler, Commercial Refrigeration Mfg., Los Angeles; Wm. A. Key, Smith Bros. Hdwe., Columbus, O.; Geo. R. Kingston, Frigidaire, Detroit; Geo. H. Kittredge, Geo. B. Bright Co., Otto Z. Klopach, Wolverine Tube, A. E. Knapp, Kelvinator, Detroit; John H. Knapp, Norge, Detroit; M. W. Knight, Copeland, Detroit; R. H. Knight, Celotex, Chicago; Irving J. Knudson, American Radiator, Chicago.

L

L. J. La Fontaine, Westinghouse, Detroit; Walter L. Lambrecht, Euth-Lambrecht, Detroit; E. C. Lamlein, Broker, Detroit; W. E. Landmesser, General Electric, Hanna Bldg., Cleveland; E. W.

(Continued on Page 13, Column 2)

HERE IS THE AMAZING NEW STREAMLINE FITTING

for Electric Refrigeration

Providing

SEALED CONNECTIONS

Without Nuts or Flares!

The New Mueller STREAMLINE Refrigerator Fitting is a permanently tight connection for Electric Refrigeration work—a fitting actually STRONGER THAN THE TUBING WHICH IT CONNECTS—yet much lighter, simpler, more quickly completed and more economical than any previous type of refrigerator fitting.

The end of the tube is slipped into the fitting, the proper distance being made positive by a shoulder inside the fitting against which the tube rests. Solder wire is fed in through a conveniently located opening in the fitting by applying heat from the blow torch.

The solder is thoroughly distributed around the joint by CAPILLARY ATTRACTION and in a few seconds a connection is completed that is refrigerant, seepage and vibration proof.

The STREAMLINE Fitting represents a remarkable saving of time and labor, as well as giving absolute assurance that every connection is both perfect and permanent. No flaring is necessary, and there is no waste "endage." The fitting itself is lighter, meaning a considerable saving in weight. Inside diameter of the fitting is the same as that of the tubing—there are no uneven surfaces or obstructions. MATERIAL AND INSTALLATION COSTS ARE CUT APPROXIMATELY IN HALF.

Mueller STREAMLINE Refrigerator Fittings, with the exception of the couplings, are FORGED. The coupling is made of extruded seamless copper tube. Forgings being made in dies under tremendous pressure, have a dense, close-grained structure that makes seepage through the fitting itself, impossible.

A Complete Line of both Flared Type and STREAMLINE Refrigerator Fittings are carried in stock and available for Prompt Shipment.

Mueller STREAMLINE Electric Refrigeration Fittings can be made to suit your special requirements.

STREAMLINE Tee, copper to copper to copper

Patent 1,770,852—Other Patents Pending

STREAMLINE Coupling, copper to copper

Patent 1,770,852—Other Patents Pending

STREAMLINE Elbow, copper to outside pipe thread

Patent 1,770,852—Other Patents Pending

Mueller Brass Co.

Port Huron, Mich.

THREE GENERATIONS OF BRASS MAKING

NO
SERVICE
PROBLEMS

NO
PARTS
INVENTORY

NO
BIG STOCK
INVESTMENT

NO
INCREASED
OVERHEAD

OVER-THE-COUNTER MERCHANDISE

An Unprecedented Profit-Making Opportunity For *Any* Dealer *Anywhere*—

The *new* Kelvinator Yukon Model

The *new* Kelvinator Yukon Community Dealer Franchise is ideal—exactly the kind of a proposition hundreds and hundreds of dealers, both in the refrigeration business and in other lines of business, have been waiting for.

Operating under a distributor, the Yukon Community Dealer does not have any service problems—the distributor handles the service. The dealer has no parts inventory, or large stock of cabinets. The distributor carries the parts and supplies Yukons to the dealers out of his stock. One demonstrator on the dealer's floor is the sum total of the dealer's investment. And the profit on every sale is *clear profit.*

No dealer is too small to cash in on this opportunity. Millions of prospects have been waiting for just such an electric refrigerator as the *new* Yukon—the BIG all-steel electric refrigerator with 5 cubic feet interior capacity; Temperature Selector, controlling 5 different freezing speeds; porcelain-lined interior; rounded corners for easy cleaning; and a host of other Kelvinator quality-features.

The *new* Yukon is "Over-the-Counter Merchandise"—all-profit merchandise—and not a dollar of profit need be invested in service, parts or increased overhead.

Dealers in all sections of the country have already proved the salability of the *new* Yukon and the profit-possibilities of the Yukon Franchise. Every day, more and more dealers are being awarded the Yukon Franchise. Upon request, we will be pleased to send you full particulars regarding the "greatest money-maker in electric refrigeration today". Use the coupon below, or write on your own business letterhead.

KELVINATOR SALES CORPORATION, DETROIT, MICHIGAN
Kelvinator of Canada, Limited, London, Ontario
Kelvinator Limited, London, England (141)

Sales Department,
Kelvinator Sales Corporation,
Detroit, Mich.

Gentlemen:—Please send me full particulars about the Yukon Franchise.

Name_____

Town_____

County_____ State_____

Line of merchandise now handling_____

_____

KELVINATOR

The New *Majestic* REFRIGERATOR

includes DRY-ZERO in its 30 Great Features

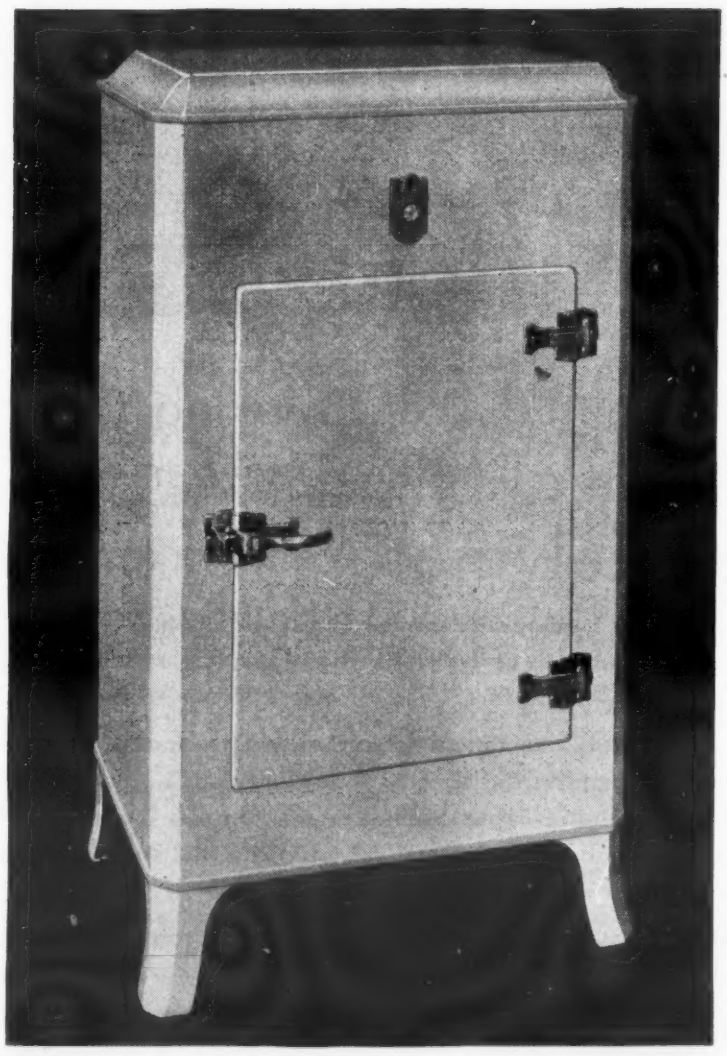
Insures Safe, Even Low Temperature with Reduced Operating Cost

Now — constant, even cold that insures new food safety! Cold sealed in—heat sealed out—by thicker, better insulation in the sensational new Majestic Refrigerator.

To insure outstanding performance, Majestic spent months searching for the finest, most efficient method of insulation. They found the answer in Dry-Zero.

Majestic tests confirmed government reports. Under every conceivable operating condition, Dry-Zero demonstrated its greater effectiveness.

In the wonderful new Majestic Refrigerator, Dry-Zero out-performed every other insulating material. It proved its ability to cut operating costs — save current consumption — reduce running time — and save wear and care.



Therefore Majestic uses Dry-Zero and plenty of it. Three inches of insulation between the pressed-steel walls of this great new refrigerator! 20% to 50% more than standard practice!

In insulation — as in every one of its 30 great features — the sensational new Majestic Refrigerator is the finest that science can build. The greatest value ever offered in its field.

Never has any refrigerator offered so much at such amazingly low cost. Never have dealers had such an opportunity for new business — new profits. Your Majestic distributor will gladly give you all the facts. Phone or wire him for all details today. Majestic Household Utilities Corp., Chicago, U. S. A.

Majestic ELECTRIC REFRIGERATOR

MIGHTY MONARCH OF THE ARCTIC

Majestic

uses

DRY·ZERO

Pliable Slab insulation

in their new all-steel refrigerator cabinets

▲

DRY-ZERO CORPORATION, 130 NORTH WELLS STREET, CHICAGO, ILLINOIS

DRY·ZERO

THE MOST EFFICIENT COMMERCIAL INSULANT KNOWN

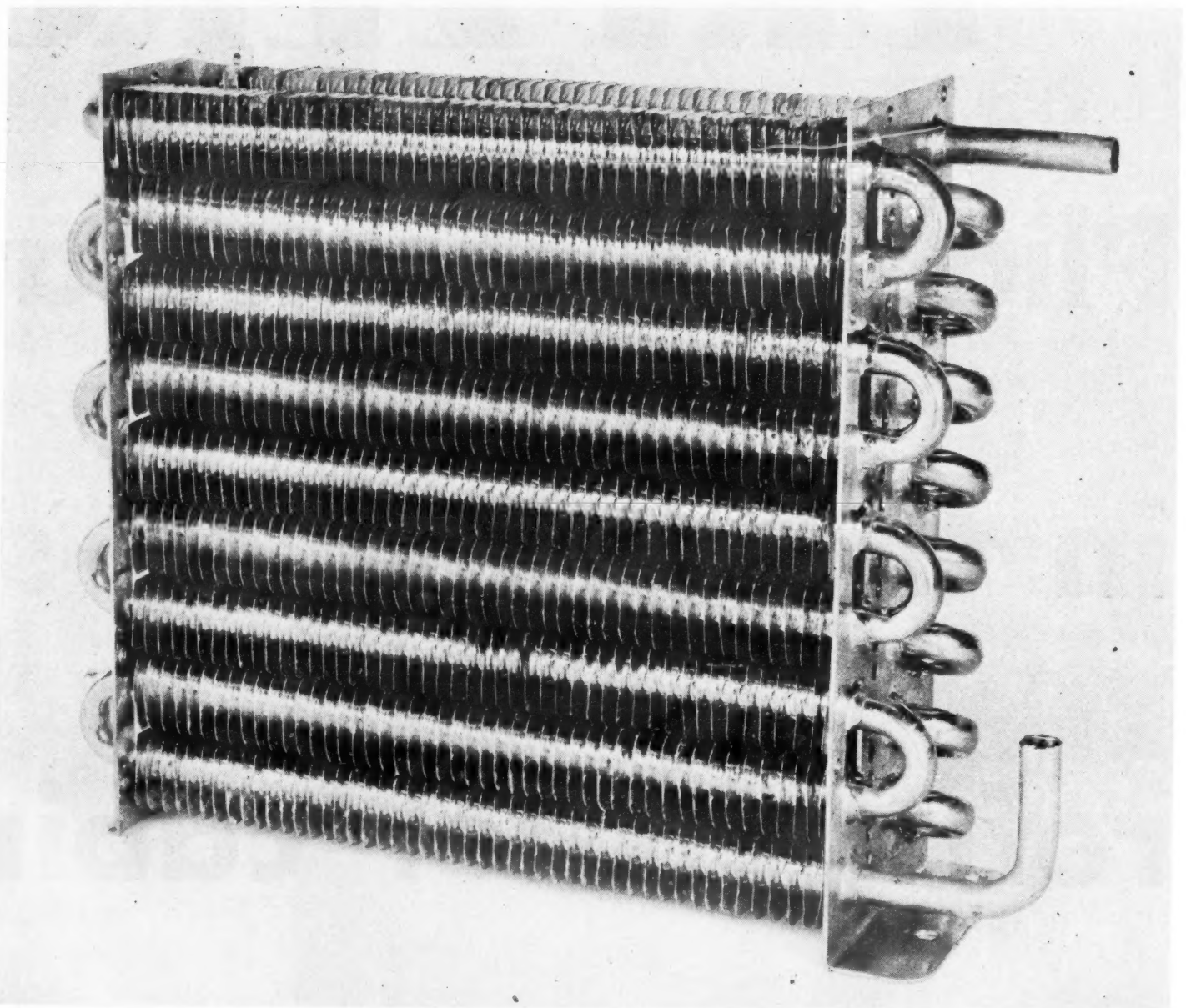
Majestic

REFRIGERATORS

ARE EQUIPPED WITH

BUSH

CONDENSERS



MANUFACTURERS OF FINNED TUBING FOR TWENTY-TWO YEARS

SEAMLESS COPPER TUBES « INDIVIDUAL FINS
MAXIMUM EFFICIENCY

LISTED AS STANDARD BY UNDERWRITERS LABORATORIES, INC., CHICAGO

THE BUSH MFG. CO.
HARTFORD, CONN.

Write us about your needs.

W. H. MARK HANNA
6-247 GENERAL MOTORS BLDG., DETROIT, MICH.

See our other announcement, page 3, Refrigerated Food Section, this issue.

65% AHEAD *in* Metropolitan New York!

OLD-TIMERS in the automatic refrigeration field are still marvelling at the speed with which Electrolux is stepping along.

During the past 9 months, Electrolux sales have been running 65% ahead of last year in Metropolitan New York. A fine increase even in boom times. And all the more remarkable today, coming on top of last year, when the whole of New York seemed to "go Electrolux" at once.

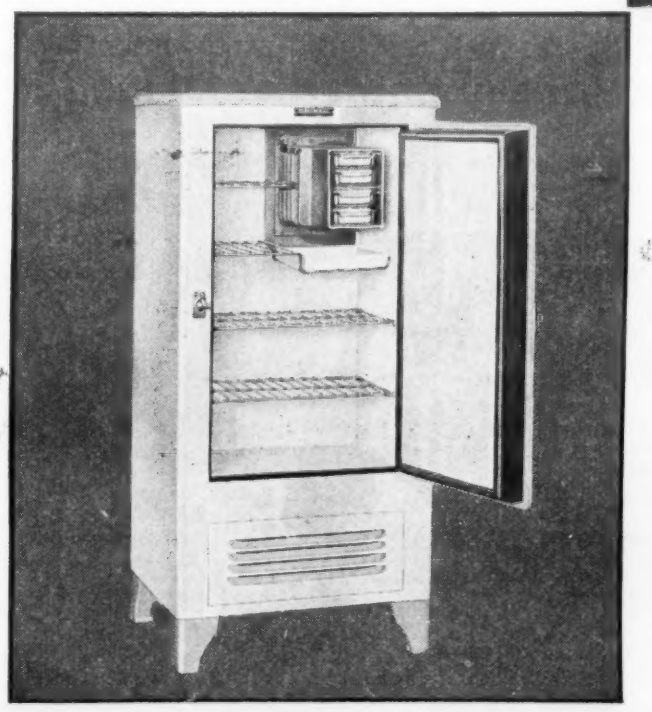
Naturally, we are very proud of this record. Because it is the most convincing testimonial to the outstanding success of Electrolux. Yet we are not surprised. For Electrolux offers what home-owners and tenants want most in an automatic refrigerator—no sound, no moving parts to cause trouble or wear out, and an operating cost that is only a fraction of what they are now paying for ice.

It was only a little more than two years ago that the first Electrolux refrigerator was placed on the market. Today, from Portland, Oregon, to New York City, architects and builders are turning to Electrolux for their fine homes and apartments; housewives are insisting upon this noiseless refrigerator for their kitchens.

Your community offers a rich market for Electrolux. Arresting advertising and word-of-mouth praise are building sales for you daily. New apartment developments mean more profits for you. So get into the swing with Electrolux, and watch your returns mount up! Electrolux Refrigerator Sales, Inc., Evansville, Ind.

Photo by Ewing Galloway

A tiny gas flame takes the place of all moving parts.



NOISELESS . . . AMAZINGLY INEXPENSIVE *to operate. These are two of the chief reasons for the great and growing acceptance of Electrolux. Kitchenette Model, one of the most popular sizes, is shown at the right.*

ELECTROLUX

THE *Gas* REFRIGERATOR

ELECTRIC REFRIGERATION NEWS

The Business Newspaper of the Refrigeration Industry

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Questionable?

IT is always easy to drift more or less unthinkingly into a policy for the simple reason that somebody else is doing it. And if that somebody else has achieved spectacular success, it is all the easier to follow his example. The possibility that the aforesaid success might have been even greater had the imitated policy never been instituted is completely overlooked.

Is the refrigeration industry today easing itself into a price policy, in imitation of the automobile industry, that may make plenty of trouble later on? The policy referred to is the announcement far and wide of a price F. O. B. factory that is rather mysteriously increased by the time the refrigerator reaches the consumer. Of late several refrigerators have been advertised at unusually low prices F. O. B. factory, but the man or woman who wants to buy one has to pay from fifteen to twenty dollars above the advertised price.

Of course, the automobile industry has been doing that very thing for many years and the public is getting pretty well used to it. But that doesn't necessarily make it the best thing to do. A glimpse into its unfavorable possibilities was afforded recently by the "Little Schoolmaster," whose weekly comment on advertising affairs in *Printers' Ink* has long been recognized as one of the most attractive features of that widely read publication. Here is what he has to say:

"The Schoolmaster is interested—in fact, he's practically amazed—by an announcement sent out by a distributing subsidiary of one of the automobile manufacturing companies to dealers in the subsidiary's territory. The announcement is concerned with an adjustment of retail prices. In the circumstances, 'adjustment' seems to be the only word that within forty rows of apple trees approximates adequacy.

"The extraordinary communication—obviously confidential—reads in part as follows:

"'To meet the present business situation and to afford you an opportunity for maximum business during the remainder of this season, prices on all..... and.....cars are reduced effective..... The new list prices, f. o. b. .....are as follows:

(The list)

'We shall immediately advertise these prices adequately throughout our territory. The delivered prices for cars delivered beginning.....will be based as follows:

'List price of car, plus regular charges for freight, handling and bumpers, plus shock absorber charge of $25 on.....and $30 on.....*and advertising charge of $15 on.....and $20 on.....*

'Price protection on cars in stock and in transit as of.....will be credited to your account on the basis of your prevailing discount. Advertising and shock absorber charges for cars in stock and in transit to you will be debited against this price protection, *inasmuch as you will collect these advertising and shock absorber charges in your new delivery prices.*'

"The italics are the Schoolmaster's; and they serve to present the disturbing question: What have we here?

"By men closely in touch with its affairs, the Schoolmaster is told that the automotive industry is rather snatching at every marketing expedient that even seems to promise sales effect.

"In the case before us, however, there seems to be potentiality for consequences highly disturbing.

"Let us of the Class assume that each of us is a dealer of this manufacturer. What are we to say to the customer who, carrying an advertisement of our 'new list prices,' comes into the salesroom to buy a car? How shall we break the news to him that shock absorbers are extra—how prevent him from believing that the industry has returned to those dark days when the 'extras' included, seemingly, everything but the flywheel?

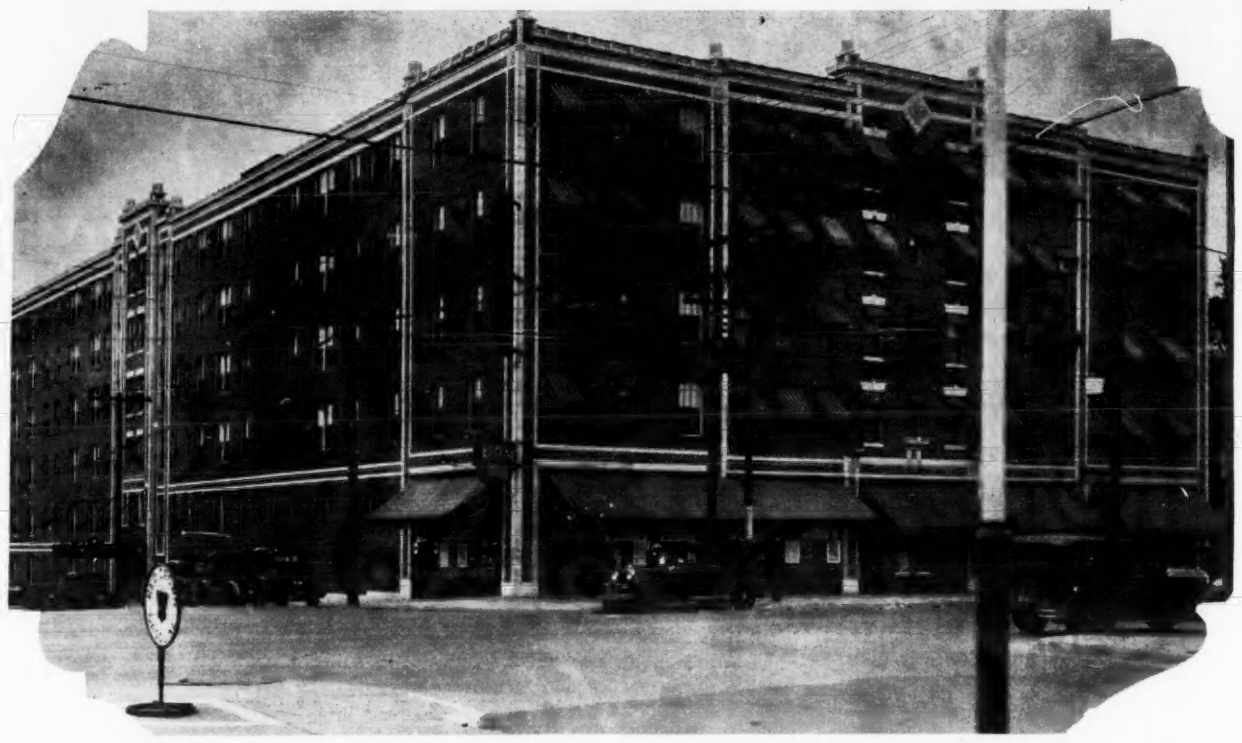
"And that advertising charge! If we lie to the customer about it, why not lie with imagination and tell him that he's contributing to a fund to buy the company president a platinum-mounted yachting cap? On the other hand, if we tell him the truth and he says, 'Advertising! Why, I've spent the past seventeen years in Africa and haven't even *seen* one of your advertisements. Why should I pay for entertainment that I haven't enjoyed?'—what shall we answer to that?"

That is frank talk. The short and ugly word is very much present. Is it justified?

If it is justified, it surely applies to the refrigeration industry today, as refrigeration manufacturers have faithfully followed the example of the automobile men on this point. What about the confidence of the public, that has been built up through the refrigerator's property of conserving health, and the able way in which the industry has hammered home that message? Can the industry afford to trifle with that confidence in the slightest degree?

After all, isn't it true that the refrigeration industry has enough problems of its own without running the risk of taking over potentially dangerous policies of other industries? Wouldn't some original thinking on the question be better than any sort of imitation?

A Refrigerator in Every Apartment



Every one of the 130 suites in the Gaylord Apartments, Kansas City, Mo., now boast a Kelvinator. Western Kelvinator Co. closed this man-sized order.

FOREIGN SHIPMENTS OF ELECTRIC REFRIGERATORS

July Shipments Reported by the Bureau of Foreign and Domestic Commerce

	Electric Household Refrigerators		Electric Commercial Refrigerators Up to 1 Ton	
	No.	Val.	No.	Val.
Austria	66	8,890	..	.....
Belgium	290	56,995	21	3,488
Czechoslovakia	105	9,245	..	.....
Denmark	66	7,117	9	1,089
Finland	25	3,334	..	.....
France	181	25,867	19	3,084
Germany	51	8,390	6	1,067
Greece	18	1,448	..	.....
Hungary	3	415	..	.....
Irish Free State	30	5,041	..	.....
Netherlands	16	1,603	4	374
Norway	28	3,325	..	.....
Poland and Danzig	2	263	..	.....
Portugal	4	700	..	.....
Spain	24	6,935	9	2,784
Sweden	125	13,748	5	755
Switzerland	36	4,817	9	1,593
United Kingdom	175	19,610	200	30,867
Canada	1,005	104,658	255	45,345
British Honduras	1	193	..	.....
Costa Rica	1	300	..	.....
Guatemala	1	130	..	.....
Honduras	2	705	..	.....
Panama	42	9,652	12	4,136
Salvador	..	.....	2	457
Mexico	178	29,281	8	2,527
Bermudas	27	4,788	2	300
Barbados	..	.....	1	394
Jamaica	2	361	..	.....
Other British West Indies	2	333	..	.....
Cuba	290	58,356	39	11,182
Dominican Republic	10	2,360	..	.....
Netherland West Indies	15	3,071	3	511
Haiti, Republic of	1	315	..	.....
Virgin Islands of U. S.	2	872	..	.....
Argentina	306	48,824	2	264
Bolivia	2	217	..	.....
Brazil	58	8,938	38	16,320
Chile	157	11,101	27	7,736
Colombia	9	1,638	2	563
Ecuador	2	239	..	.....
British Guiana	8	1,800	..	.....
Surinam	3	760	..	.....
Peru	5	733	1	1,026
Uruguay	109	15,625	2	401
Venezuela	42	6,542	1	299
Aden	4	590	..	.....
British India	28	4,627	10	3,586
British Malaya	35	6,280	..	.....
Ceylon	11	1,721	..	.....
China	..	.....	1	238
Java and Madura	13	3,047	1	182
Other Netherland East Indies	2	566	..	.....
Hong Kong	22	1,721	..	.....
Japan	106	13,223	12	2,593
Palestine	..	.....	1	216
Siam	10	1,987	1	848
Syria	1	91	..	.....
Turkey	13	1,737	1	204
Australia	140	16,673	19	2,585
British Oceania	1	220	..	.....
New Zealand	49	7,631	24	4,423
Union of South Africa	107	24,403	20	4,723
Other British So. Africa	4	459	..	.....
Gold Coast	17	2,780	..	.....
Nigeria	1	118	..	.....
Egypt	15	2,152	..	.....
Algeria and Tunisia	1	94	..	.....
Morocco	8	975	..	.....
Canary Islands	3	770	..	.....
Total	4,116	$581,460	767	$156,160
Shipments to—				
Hawaii	72	$ 13,389	13	$ 2,291
Porto Rico	34	7,075	3	1,454

LUCKY THIRTEEN ORDER FOR AKRONITE

Akron, Ohio—The number "13" may be unlucky for some people, but A. Crapper, commercial manager of the Willis Company, decided it was a lucky one for him when he sold an order for 13 General Electric water coolers for the Akron Savings Bank Building. Two coolers were installed in the banking rooms and one on each of the 11 floors.

Mr. Crapper's friends are complimenting him on this order, and especially because he defied the time-old superstition about the number thirteen.

Another building recently equipped with G. E. coolers was the Akron Second National, where 11 pressure type coolers were installed. These are of the new D. P. 3 type, with a capacity for 12 gallons an hour at 30 degrees differential. The clinching argument in selling that order, according to Crapper, was the small space taken up by the coolers, 21 by 25 inches.

That the workmen building the largest airship in the world in the largest hangar in the world, might not go thirsty, five G. E. water coolers, three of the pressure type and two of the bottle type, were installed in the Goodyear Zeppelin hangar recently.

Seventy-seven G. E. refrigerators found their way last month into the new Mayfield Group of Apartment houses recently erected in the exclusive Portage Club district. The three- and four-room suites were equipped with G 40's, and the eight-room suites with G 55's.

KELVINATOR EXPORT MEN GET TOGETHER IN DETROIT

Detroit, Mich.—The Export Division of the Kelvinator Corporation is now acting as host to overseas representatives, who came to Detroit to attend the annual conference, which is now in session. The meeting started Tuesday, October 7, and will be concluded Friday, October 10. The object of the conference is to give to the overseas representatives full information concerning technical advances in the electric refrigeration industry, the latest developments in production, and the results of the research activities of the Kelvinator organization. The specific operation of each overseas sales territory will also be discussed. This part of the meeting will give each foreign representative an excellent opportunity to gain first-hand knowledge of problems he may soon have to face.

Those in attendance at the conference are: Howard A. Lewis, treasurer and director of foreign operations; R. A. Lundquist, manager of the Export Division; E. H. Wilcox, associate manager of the Export Division; Frank Conroy, manager of export traffic; Baron Luigi Parrilli, European manager; Roberto Parrilli, European service manager; Ralph Searle, manager, Kelvinator, Limited, London, England; John F. Stevens, Jr., Asiatic manager; Benjamin D Manchester, Australasian manager; Reginald Gorham, South American manager; M. I. Blumenthal, Central American representative, and F. S. McNeil, manager of Kelvinator of Canada, Ltd.

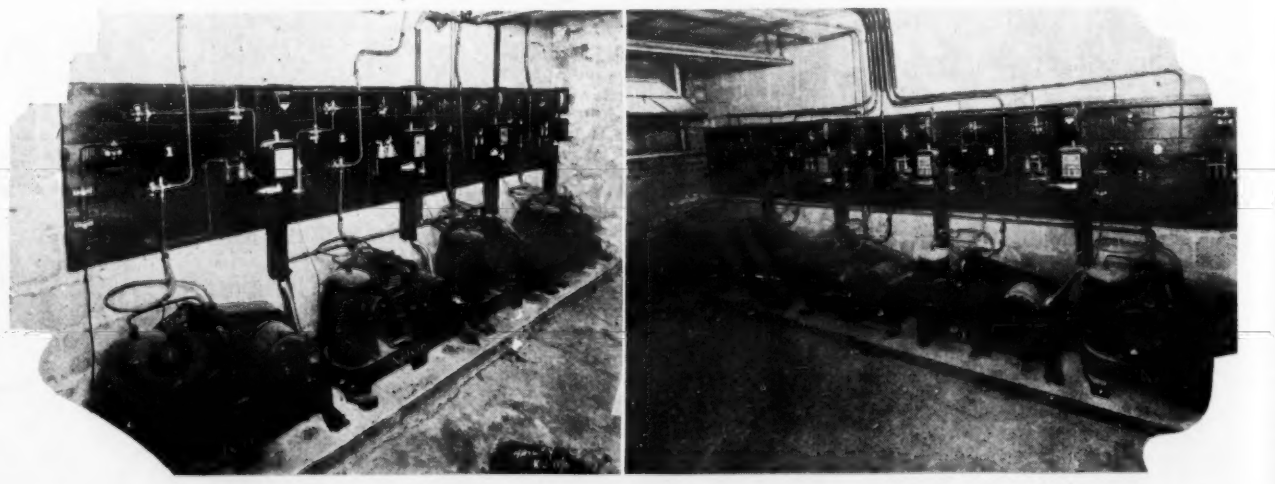
The entire export delegation attended the meeting of American Society of Refrigeration Engineers at the Hotel Statler on Monday evening.

At the conclusion of the Detroit conference, the party will make a tour by special car into Canada, visiting London, Ontario, and Toronto, Ontario, especially, in the course of which they will study some successful retail operations in that cold weather market.

WILHELM TO DIRECT SEATTLE SALES

Seattle, Wash.—Announcement has been made of the appointment of Louie B. Wilhelm as manager of the electric refrigeration department of Schoenfeld Stand Furniture Company, Seattle. Kelvinator equipment is sold.

These Nine Compressors Handle the Whole Job



To supply refrigeration requirements of the Gaylord Apartments, the Western Kelvinator Co., Kansas City, Mo., installed nine WR-40 condensing units.

WIDER DISTRIBUTION FOR WESTINGHOUSE IN EAST

Philadelphia, Pa.—The Westinghouse Electric Supply Company, distributors for Westinghouse refrigerators in eastern Pennsylvania, southern New Jersey, Delaware, Maryland, Washington, D. C., and Virginia, is busy organizing outlets for the sale of the new Westinghouse refrigerator. Unusual interest has been shown by the dealers in the new product, and buyers, too, have been visiting the showrooms in large numbers.

Typical Westinghouse showrooms have been installed by several of the outlets, notably the Davison Refrigeration Company, whose main store is located in the famous Chestnut Street shopping district at 1733. They also have an unusually attractive showroom in the Germantown section at 57 W. Chelten Ave.

Poole's Electric Stores Co., Inc., maintains its showroom at 3 E. 9th Street, Wilmington, Delaware, and the Harrison-Nichols Company has recently opened quarters at Morris and Atlantic Avenues, Atlantic City, N. J. A. L. Held, Inc., in Upper Darby, Pa., just outside of Philadelphia, had his new showroom, on West Garrett Rd., ready about Oct. 1.

In other sections of the territory refrigeration dealers have been set up, among them being I. B. Abel & Son, York, Pa.; C. H. Reynolds, Lewistown, Pa.; Penman J. Wood, Ardmore and Norristown, Pa.; W. N. Hall, Carlisle, Pa.; Borstein Electric Co., Camden, N. J.; Perkasie Electric Co., Perkasie, Pa.; H. M. Vondersmith, Lancaster, Pa.; Simpson Electric Construction Co., Annapolis, Md.; A. G. Crunkleton Electric Co., Greencastle, Pa.; F. E. Mickey Electric Co., Chambersburg, Pa.; R. W. Wentz, Gettysburg, Pa.; Downes' Music Store, Inc., Dover, Del.

Intensive newspaper and outdoor advertising are being carried on throughout the territory, aided by several direct by mail campaigns. R. B. Cook, refrigeration sales promotion manager of Westinghouse Electric Supply Company, states that all Westinghouse dealers are enthusiastic about the selling plan.

APARTMENT INSTALLATION

Redwood City, Calif.—Frigidaire electric refrigeration will be furnished by J. P. Neifing, Palo Alto, Calif., Frigidaire dealer, for the $85,000 three-story apartment building that M. E. Ryan, owner, is having constructed at No. 1 Duane Street, Redwood City.

NEW EVANSVILLE BRANCH

Evansville, Ind.—The A-I Building Material Company, Kelvinator distributor in southern Indiana, has opened a dealer branch at 125 N. W. Second St., in charge of Edward B. Waldschmidt.

COLLAR IS PACEMAKER IN UTILITY CAMPAIGN

Minneapolis, Minn.—The "Bust the Bulb" selling campaign of the Northern States Power Co. closed recently, with all divisions topping the mark. Of the eighteen divisions battling for supremacy in Kelvinator sales, the Fargo division came out first, and captured the grand prize. Salesman A. F. Collar, of the Fargo division, did an outstanding job. His quota was set at 28 units, but he finished with a quota of 85 units, or a percentage of 303. The combined divisions turned in 127% of their quota.

In the contest between Minneapolis and St. Paul, honors came out even. St. Paul sold the most units, while Minneapolis sold the largest dollar volume. Money prizes were awarded to the successful divisions and to the successful salesmen individually.

COPELAND GOES INTO YELLOWSTONE PARK

Spokane, Wash.—Harper-Meggee, Inc., Copeland distributor for Oregon, Washington, Idaho and Montana, has just completed the installation of a large commercial unit at the Gardiner entrance of Yellowstone Park. One unit is used to cool a large display box, a display case and a milk cooling cabinet.

DIETZ LINES UP WITH MAJESTIC IN NEWARK

Newark, N. J.—Herbert Fink, president of the North Ward Radio Co., Inc., Majestic Radio wholesalers for New Jersey, of 367 Plane Street, Newark, has announced the appointment of A. Fred Dietz as engineer in charge of operations in connection with the new Majestic electric refrigerator.

A graduate of Pratt Institute, member of the American Society of Refrigeration Engineers, and honorary member of Institute International Refrigeration Du Froid, Mr. Dietz comes into the Majestic picture with a background of scientific experience. He has been actively associated with refrigeration in the Breyer Ice Cream Company, of Philadelphia, and other units of the National Dairy Company, conducting research and developments in connection with organization and instruction in matters of service.

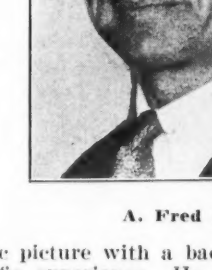
A. Fred Dietz

It is the plan of the North Ward Company to install an up-to-date and thoroughly equipped service department for refrigeration, and to establish a school for local service men supervised by Mr. Dietz, through which the dealer clientele may be educated in Majestic refrigeration from the ground up.

Mr. Dietz has just attended a two-weeks' intensive course at the Majestic factory.

FLINTLOCK CONDENSERS

Full Capacity



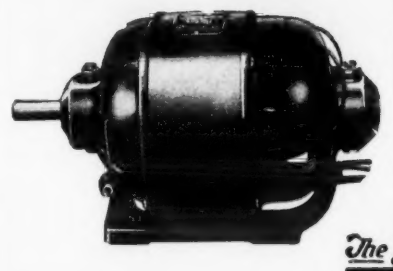
With Every Unit

FIN AND TUBE SAME SOLID PIECE OF MATERIAL

FLINTLOCK CORPORATION

4461 W. Jefferson Ave.
DETROIT, MICH.

Silent as the Setting Sun



So quiet that, standing a yard away, you cannot detect a sound . . . . so free from vibration that movement is unnoticeable . . . . so dependable that it runs for years without attention, the specially designed Leland motor is the best equipped unit for electric refrigeration yet developed.

The Leland Electric Co.
Dayton Ohio. U.S.A.

for moderate sized installations the ammonia men choose Servel . . .

LEADING DISTRIBUTORS of ammonia equipment now install Servel machines on jobs that call for 1400 pounds daily ice melting equivalent or under.

They know better than almost anyone else in the industry, the heavy demands placed on every commercial installation.

They realize that lightly built units will not stand up through year after year of strenuous service — and that service calls mean dissatisfied customers and smaller profits.

These are the men who are turning to Servel to handle all moderate-size installations. They recognize at a glance the sturdier construction of these expertly engineered machines.

Profit by their experience! The Servel Commercial Series is the most complete on the market today—ranging from 75 pound to 1400 pound capacities. You'll find it easy to meet precisely the requirements of every customer—to give him an economical installation that stands up through years of hard work.

With Servel you can close hundreds of profitable deals in your territory.

Write and learn whether the Servel Franchise in your district is still open.

SERVEL SALES, INC.
EVANSVILLE, INDIANA

SERVEL

In your territory—a tremendous market for SERVEL Commercial Refrigeration

Meat Markets
Grocery Stores
Hotels
Restaurants
Cafeterias
Ice Cream Dealers
Dairies
Bakeries
Drug Stores
Florists
Hospitals
Confectioners

Warning Agent in Multiple Systems Found Satisfactory

Acrolein Studied Exhaustively in Apartment Installation by Bureau of Mines

By H. H. Schrenk, F. A. Patty and W. P. Yant

In accordance with the outline of investigation described in a previous report* of the Bureau of Mines, dealing with the use of acrolein for detecting leakage of methyl chloride from unit-type refrigerating systems, the work has been extended to include an investigation of its use in a multiple system. This report gives the results of analysis of samples of the gas from representative units of a multiple system charged with methyl chloride containing approximately 0.9 per cent acrolein by volume. The results furnish a basis for estimating the warning that would be given in event of leakage. The properties and warning intensity of acrolein have been described in a previous report.*

Acknowledgments

This investigation was made at the combined request of Servel, Inc., manufacturers of refrigerating appliances, and the Roessler & Hasslacher Chemical Co., manufacturers of methyl chloride. Acknowledgment is given to R. M. Major, chief chemist of the former firm, for arranging the experimental site and equipment; to Arthur O. Hassensall, owner of the apartment building where the investigation was conducted, for his courtesy in permitting the investigation; and to R. R. Sayers, chief surgeon, Bureau of Mines, and surgeon, U. S. Public Health Service, for suggestions and advice.

*Yant, W. P., Schrenk, H. H., Patty, F. A., and Sayers, R. R., Acrolein as a Warning Agent for Detecting Leakage of Methyl Chloride from Refrigerators: Repts. of Investigations, Serial 3027 Bureau of Mines.

Apparatus and Test Procedure

The multiple system studied was a practical installation in a two-story brick apartment house with basement. The apartments, 14 in number, were all on the second floor. Figure 1 is the floor plan and shows the position of the refrigerators, and Figure 2 is a diagrammatic sketch of the piping and flow of refrigerant.

The multiple system was Model 100-A, manufactured by Servel, Inc. It was pressure-controlled and operated on a pressure range of 6 to 20 pounds. The compressor, condenser, receiver, and high and low pressure manifolds were in the basement. Liquid flowed from the high-pressure manifold (Figure 2) through 1/4 and 5/16-inch (outside diameter) copper tubing to the individual units, and returned through 5/16 and 3/8-inch (outside diameter) copper tubing connections. The larger of the sizes was used when two refrigerating units were connected in parallel as numbers 202-203, 205-207, 209-213, 214-215. The copper tubes were protected by conduits. All valves on the manifold were of the Mueller packless type. The amount of liquid methyl chloride that entered each unit was controlled by the float valve in that unit, similar to the household single-unit refrigerator described in a previous report.* The direction of flow of methyl chloride is indicated in Figure 2 by arrows.

According to the records of Servel, Inc., the system was charged on February 17, 1930 (3 months prior to this study), with about 30 pounds of methyl chloride containing approximately 0.9 per cent (by volume) of acrolein. Charging was effected with liquid phase material.

Seven of the return lines (six single lines and one dual line) from individual refrigerators were connected to a sampling manifold by placing a T between the return-manifold valve and the unit (Fig. 2), so that vapor from the units could be individually sampled by closing the return-manifold valve. This arrangement was installed one week prior to analysis. The sampling manifold consisted of a brass bar 1¼ inches square and 12 inches in length. A ½-inch hole was drilled longitudinally to a depth of 10 inches, and the sides were drilled and tapped to receive seven ¼-inch needle valves (five on the top and two on the side). Each of the valves was connected by copper tubing to one of the return lines. The open end of the longitudinal hole was fitted with a ¼-inch nipple for making a copper-tubing connection to the sample-collecting device. The details of sampling and analysis are the same as those given in a former report.*

Sampling Procedure

Under normal operation of the system the compressor ran for a period of approximately 11 minutes and remained idle for 30 minutes. As soon as the compressor stopped running the low side or return-manifold valve of the unit being sampled was closed and remained closed throughout the sampling period. The needle valve on the sampling manifold was opened, and manifold connections purged with about 1 liter of vapor before the sample for analysis was taken. Two samples from each unit were taken consecutively as soon as practicable after the compressor stopped, and a third about 20 minutes after it stopped. This procedure was used for 30 of the samples. Nine more samples were taken with all valves on the low side manifold open, five while the compressor was running, and four after it stopped. Duplicate samples were taken from the high side liquid. The oil in the compressor crankcase was also analyzed for acrolein.

Results of Analyses

Table 1 gives the conditions under which samples were taken and the results of analyses. In brief, the majority of the results ranged from 0.19 to 0.25 per cent acrolein by volume, regardless of test conditions, with a maximum range of 0.14 to 0.36 per cent.

Table 1. Detailed Test Conditions and Results of Analyses

Apartment	Time of day	Time in minutes after compressor stopped	Acrolein, per cent by volume
	May 21, 1930—p. m.		
201	3:46	24	0.24
	3:56	5[3]	.20
	May 22, 1930—a. m.		
	8:42	3	.23
	8:46	7	.22
	9:01	21	.20
208	9:26	5	.24
	9:31	10	.19
	9:42	21	.17
210	10:15	11	.22
	10:25	21	.20
206	10:50	2	.21
	10:54	6	.20
	11:10	22	.14
204	11:31	1	.17
	11:36	6	.23
	11:52	22	.28
	May 22, 1930—p. m.		
212	1:35	2	.24
	1:40	7	.24
	1:55	22	.30
202–3	2:16	3	.25
	2:19	6	.25
	2:34	21	.23
	May 23, 1930—a. m.		
210	8:44	2	.13
(3)	8:53	11	.15
	9:03	21	.13
	11:32	2	.22
204	9:26	1	.29
	9:46	21	.19
212	10:09	1	.36
	10:29	21	.24
	May 23, 1930—p. m.		
210	2:52	2	.22
	3:16	26	.16
	3:22	2[2]	.32
	3:29	9[2]	.23
	3:38	5	.20
202–3	3:58	25	.20
	4:03	2[2]	.30
	4:11	9[2]	.25
	4:18	6	.27

[1]All samples taken to 10:29 a. m., May 23, were with return-manifold valve closed while sampling. All samples taken between 2:52 and 4:18 p. m., May 23, were with return-manifold valve open while sampling.

[2]Compressor running—time in minutes after start.

[3]Door of refrigerator open 1-1 2 inches from 6 p. m., May 22, 1930, to 7:45 a. m., May 23, 1930.

Analyses of the vapor phase from units in apartments 201, 208, 206 and 210 on May 22, 1930, between 8:42 and 11:10 a. m., showed a slight but definite decrease in acrolein concentration with an increase in time after the compressor stopped. Analyses from units in apartments 204 and 212 on May 22, 1930, between 11:31 a. m. and 1:55 p. m., showed an increase in concentration with increase in time. These same two units analyzed on the following morning at 9:26 to 10:29 showed a decrease in concentration with time. The vapor from the dual line from units in apartments 202 and 203, analyzed May 22, 1930, between 2:16 and 2:34 p. m., showed practically no change in acrolein content with time after compressor operation.

Analyses from the unit in apartment 210 after the door of the refrigerator had been left open overnight, showed a definite decrease in concentration, the amount found being about 65 per cent of its normal value one hour after the door was closed. Four hours later it was back to normal.

Analyses of samples taken from units in apartments 210 and 202-203 while the return manifold valve was open, showed a decrease in concentration of acrolein with time during the period in which the compressor was idle. Samples taken from these units while the compressor was running tended to be slightly higher than after it stopped. The acrolein content also appeared to decrease with time of operation.

Results of Analyses of High-Pressure Liquid

Analysis of the high-pressure liquid distributed to the units showed an acrolein concentration of 0.22 and 0.17 per cent. This is similar to the concentration found in the vapor which returned from the units.

Analysis of Oil in Compressor Crank Case

Duplicate samples of oil taken from the compressor crankcase were found to

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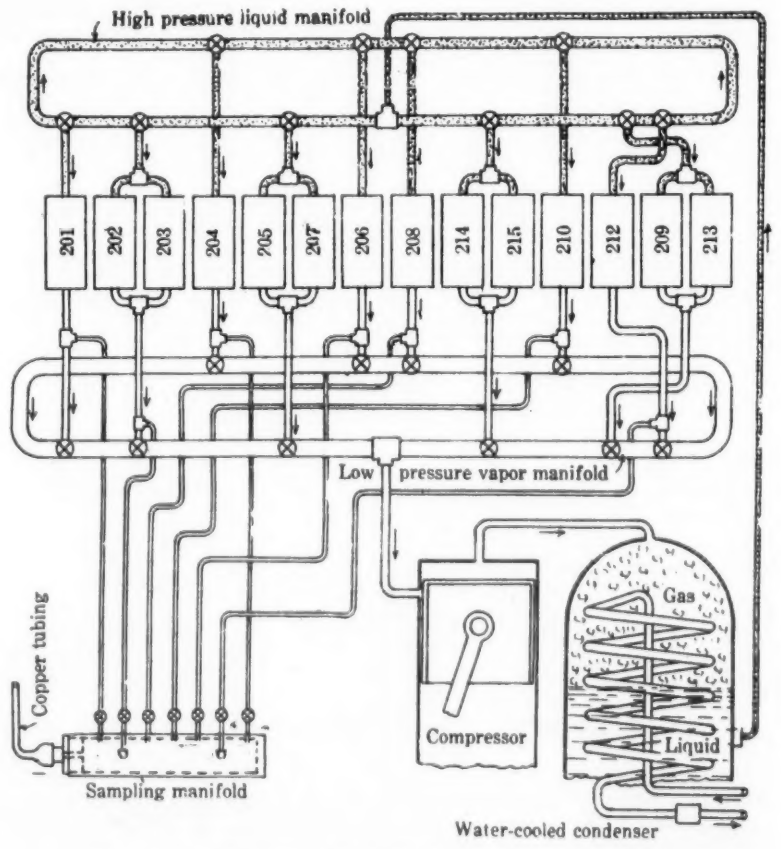
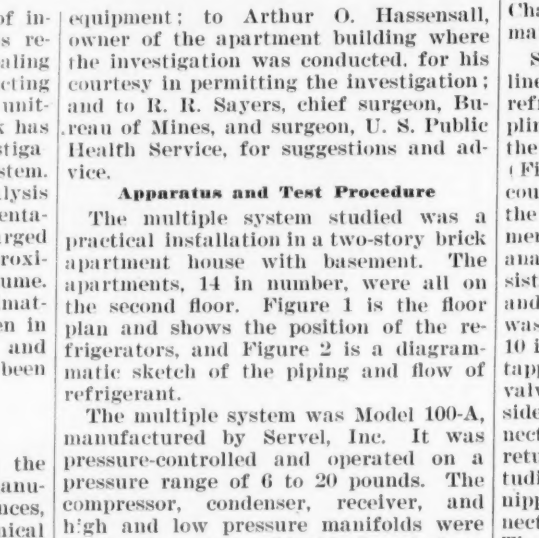


Figure 2.—Diagram of manifold system and sampling arrangement in the apartment



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Modernize your old installations with the Airswitch. It is quickly and easily added to an installed unit. Take advantage of this profitable market.

Because of its Time-O-Stat Mercury Switch, it operates dependably, without attention, and with unusually long life. Where Time-O-Stat Mercury Switches are used switching action is always positive and protected. Send for complete information on Time-O-Stat refrigeration controls—with Mercury Switches.

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EXCLUSIVE DISTRIBUTORS IN ALL PRINCIPAL CITIES OF THE UNITED STATES.
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Fourteen Units Subjected to Tests

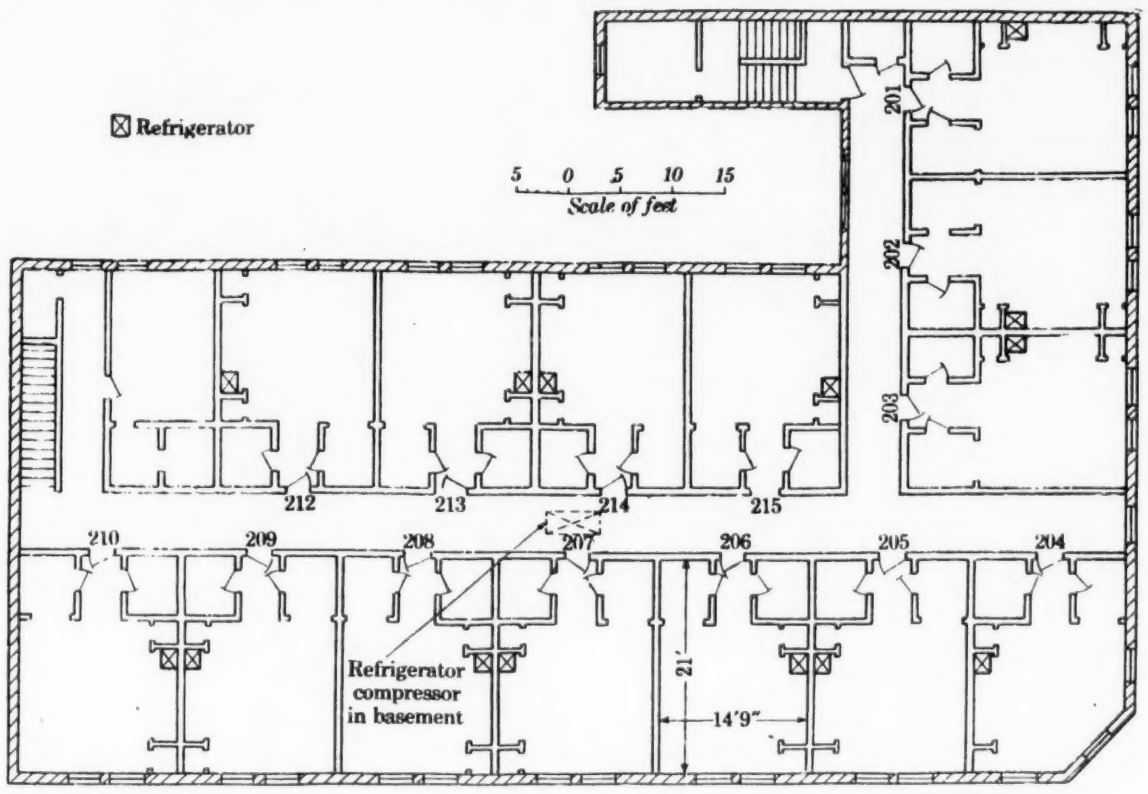

Figure 1.—Floor plan of apartment house showing location of refrigerating units

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contain 0.28 to 0.33 milligram of acrolein per cubic centimeter of oil.

Analysis of Stock Methyl Chloride-Acrolein Mixtures

Triplicate samples (liquid phase) taken from a large stock cylinder of methyl chloride-acrolein mixture received with the same lot of material used for charging the system, were found to contain 0.68, 0.70 and 0.71 per cent acrolein by volume.

Efficacy of Acrolein as a Warning Agent in a Multiple Refrigerating System

It has been shown in a previous report* that one part of acrolein vapor per million parts of air gives adequate warning (manifested by marked eye and nose irritation) in five minutes. On this basis, with 0.23 per cent acrolein in the vapor from refrigerating appliances (the average of all results given in Table 1) a warning concentration would be attained when 0.04 per cent methyl chloride was present in the air. On the basis of 0.13 per cent acrolein in methyl chloride vapor (the lowest value found), a warning concentration would be attained when 0.08 per cent methyl chloride was present. Animal experiments† have indicated that 0.05 to 0.10 per cent methyl chloride in air by volume does not cause apparent harm after exposure of several hours' duration.

The Authors

THE writers of the report on acrolein as a warning agent, printed herewith in full, are all connected with the health laboratory section of the United States Bureau of Mines Experiment station in Pittsburgh. They are:

H. H. Schrenk, chemist in charge, toxicological and biochemical laboratory.

F. A. Patty, assistant physiological chemist.

W. P. Yant, supervising chemist.

The report represents work done under a co-operative agreement between the U. S. Bureau of Mines, Department of Commerce, the Roessler & Hasslacher Chemical Co. and Servel, Inc. It is reprinted from U. S. Bureau of Mines Report of Investigations No. 3031.

Summary and Conclusions

The acrolein content of the low-pressure side (vapor phase) and high-pressure side (liquid phase) of a multiple refrigeration system charged with methyl chloride containing approximately 0.9 per cent acrolein by volume, was determined with the following findings:

1. The low-pressure side (39 analyses of return vapor from *eight* individual units in the system) was found to contain 0.14 to 0.36 per cent acrolein by volume, with about 75 per cent of the results falling within the range of 0.17 to 0.25 per cent.

2. The high-pressure side (two analyses of liquid distributed to the units) was found to contain 0.17 and 0.22 per cent acrolein by volume.

3. In the majority of instances where the return vapor from a particular unit was analyzed at intervals after the compressor had stopped in its cycle of operation, the concentration was found to decrease slightly with increase in time after the compressor stopped. In effect, this is a decrease in concentration with increase in pressure in the low-pressure side. However, in two instances of nine the reverse was observed.

†Sayers, R. R., Yant, W. P., Thomas, B. G. H., and Berger, L. B., Physiological Response Attending Exposure to Vapors of Methyl Bromide, Methyl Chloride, Ethyl Bromide, and Ethyl Chloride: Public Health Bul. 185, March, 1929, 56 pp.

4. Analysis of the vapor from a unit after the door was left open over night showed a decrease in concentration of acrolein. Four hours after the door was closed the concentration was equal to the average found for all units.

5. Exposure to one part of acrolein vapor in a million parts of air produces marked irritation of the eyes and nose in five minutes or less. By using this as a criterion of the amount necessary to give warning, leakage from the units would be readily detectable when the methyl chloride concentration in air was 0.04 to 0.08 per cent by volume. Animal experiments have indicated that 0.05 to 0.10 per cent methyl chloride in air by volume does not cause apparent harm after an exposure of several hours.

A. S. R. E. DETROIT

(*Concluded from Page 4, Column 5*)

Lothrop, Kelvinator, Detroit; M. J. Laurie, McCormick-George, Detroit; N. G. Leakey, National Ammonia Co., Meldrum Ave., Detroit; Claude Le Clure, Ralph P. Peckham, Detroit; John J. Leonard, Seeger Refrigerator, St. Paul, Minn.; C. H. Lewis, Frigidaire, Detroit; Chas. C. Limbocker, Wolverine Tube, Detroit; Harvey B. Lindsay, Dry-Zero, Chicago; E. Earl Lines, Detroit; M. W. Lloyd, Austin F. Bement, General Motors Bldg., Detroit; A. G. Loeffel, Detroit City Service, Detroit; E. D. Long, Frigidaire, Detroit; O. G. Lonskey, Copeland, Detroit.

M

H. F. MacGrath, Seeger Refrigerator, Detroit; Park A. Manross, Kelvinator, London, Ont.; D. J. Martin, Detroit City Service, Detroit; Ray M. Martin, Kelvinator, Detroit; John C. Mathews, Export Factor, Copeland, Edw. M. May, Mayson Mfg., Detroit; S. J. McCarthy, R. P. Peckham, Detroit; A. L. McCormick, McCormick-George, Detroit; E. E. McCray, McCray, McCray Refrigerator, Kendallville, Ind.; J. J. McKeague, Zerozone, Chicago, Ill.; J. M. Milhon, McCormick-George, Detroit; Wm. A. Misner, City Ice & Cold Storage, Battle Creek, Mich.; C. M. Mohler, Willys Export, Toledo; Glenn Muffly, Copeland, Mt. Clemens, Mich.; E. J. Mueller, Vilter Mfg. Co., Detroit; C. T. Mutchner, Frigidaire, Dayton, O.; Edgar Myers, Rex, Connersville, Ind.

N

John E. Naegely, Kelvinator, Detroit; R. G. Nelson, Leonard, Grand Rapids, Mich.; P. G. Nicholson, Continental Realty Co., Detroit; Alfred Nielsen, Nona Lake Ice Co., Muskegon, Mich.; J. H. Nugent, Absopure, Detroit; H. Geo. D. Nutting, Detroit Edison, Detroit.

O

J. M. Oberc, F. B. Riley & Asso., Detroit; H. S. Oderman, Detroit City Service, Detroit; J. J. Oderman, Detroit City Service, Detroit; J. B. Ogden, J. L. Hudson, Detroit.

P

W. D. Paxton, Frigidaire, Detroit; Ralph P. Peckham, Ralph P. Peckham Co., Detroit; Frank D. Peltier, Servel, Evansville, Ind.; T. S. Pendergast, Absopure, Detroit; R. S. Penn, Copeland, Detroit; P. G. Perkins, Kelvinator, Detroit; L. A. Philipp, Kelvinator, Detroit; A. V. Phillips, Kelvinator, London, Ont.; H. D. Phillips, Flintlock, 4461 W. Jefferson, Detroit; R. F. Polley, Zerozone, Chicago; H. A. Pollock, Westinghouse, Detroit; Chas. A. Poxson, Newton Steel, Detroit; A. Prance, Frigidaire, Detroit.

R

L. W. Ranney, Ranney Refrigerator, Greenville, Mich.; W. C. Rasch, Armstrong Cork, Detroit; P. J. Reese, Wagner Electric, Detroit; S. J. Rehmar, Electric Refrigerator Exchange, Cleveland; L. G. Rentler, Lansing Ice & Fuel, Lansing; J. R. Rightmire, Wagner, Detroit; F. B. Riley, Standard Refrigerating Appliances, Detroit; Raymond Ring, Dry-Zero, Chicago; H. M. Robins, H. M. Robins Co., Detroit; E. C. Robinson, Century Electric, Detroit; B. T. Roe, Leonard Refrigerator, Detroit; T. D. Rowan, Fones Bros. Hdwe, Little Rock, Ark.; B. F. Rowland, General Electric, Detroit; Wm. C. Rowles, Climax Refrigerator, Chicago.

S

J. S. Sarasohn, Absopure, Detroit; J. S. Sayre, Kelvinator, Detroit; A. J. Scott, Detroit City Service, Detroit; Hugh J. Scullen, Kelvinator, Detroit; E. A. Seibert, Kelvinator, Detroit; W. J. Seroy, Zorite Products, Oakland, Calif.; H. C. Sherk, Copeland, Detroit; J. H. Shenberg, Detroit Majestic Products, Detroit; W. A. Shirk, Grigsby-Grunow, Chicago; Carleton S. Smith, Copeland, Mt. Clemens, Mich.; Chas. A. Smith, Frigidaire, Detroit; Leslie C. Smith, National Ass'n Ice Ind., Chicago; L. H. Smith, McCormick-George, Detroit; P. J. Smith, Ford Airport, Detroit; R. T. Smith, Gibson Refrigerator, Greenville, Mich.; W. W. Smith, The J. W. Green Co., Toledo, Ohio; M. B. Sokoloff, Borin Bros., Inc., Detroit; C. C. Spreen, Kelvinator, Detroit; Oscar F. Stauder, Westerlin & Campbell Co., Detroit; Geo. Steers, Jr., Kalamazoo Ice & Fuel, Kalamazoo, Mich.; H. M. Stewart, McCray Refrigerator, Kendallville, Ind.; C. A. Straut, Copeland, Grand Blvd., Detroit; C. H. Stull, G. H. Stull Co., Grand Rapids, Mich.; O. L. Sugman, Detroit City Service, Detroit; E. D. Summers, Armstrong Cork, Grand Rapids, Mich.; W. E. Sutton, Copeland, Detroit.

T

C. H. Tanger, Servel, Evansville, Ind.; Geo. Taubeneck, Electric Refrigeration News, Detroit; J. W. Taylor, Copeland Detroit; A. M. Taylor, Kelvinator, Detroit; P. Tazelaar, Commonwealth Brass, Detroit; C. E. Terry, P-T Milk Cooler, Cleveland; A. G. Teweles, Jersey City, N. J.; G. H. Thomas, Frigidaire, Detroit; M. H. Thurnauer, The Anom Co., Cincinnati; K. E. Tobin, Copeland, Detroit; H. R. Tracy, Ballau, Johnson & Nichols, Providence, R. I.; E. L. Triffit, Brooke, Smith & French, Detroit; H. A. Turner, McCormick-George, Detroit; T. Tuttle, Kelvinator, Detroit.

V

H. Vandeburg, Wolverine Tube, Detroit; W. R. Vivian, Westinghouse, Toledo; L. J. Voyer, Newton Steel, Youngstown, O.

W

Edw. F. Wallich, Wallich Ice Machine, Detroit; R. E. Weaver, Frigidaire, Detroit; F. G. Weed, Rinshed-Mason, Detroit; B. L. Wells, Wagner Electric, Detroit; T. R. West, Kelvinator, Detroit; E. C. White, Gardner-White Co., Detroit; E. K. White, Gardner-White, Detroit; D. C. Wick, Frigidaire, Detroit; D. D. Wile, American Radiator, Detroit; Fremont Wilson, Consulting Engineer, New York; Ray J. Wilson, F. E. Winter, Hunty Mfg. Co., Detroit; Paul F. Witte, Witte & Burden, Detroit; I. Wolf, McCray Refrigerator, Detroit; Campbell Wood, Kelvinator, New York; Frank L. Wurl, Mayson Mfg. Detroit; F. N. Wyatt, General Electric, Detroit; John Wyllie, Jr., Kelvinator, Detroit.

Y

S. K. Young, Frigidaire, Detroit.

LEONARD CONTINUES ITS BIRTHDAY PARTY

Detroit, Mich.—The Leonard Refrigerator Company, division of Kelvinator Corporation, whose plant is in Grand Rapids, and executive offices with Kelvinator in Detroit, is celebrating its Fiftieth Anniversary as a manufacturer of electric refrigerators.

The officials of the Leonard Company and its field representatives, headed by A. H. Jaeger, Vice-President in Charge of Sales, and executives of the Kelvinator Corporation, met at the Player's Theatre on Jefferson Avenue at 10:00 A. M. on October 6th. Speakers at the morning session were Geo. W. Mason and H. W. Burritt, President and Vice-President of the Kelvinator Corporation, respectively, and Mr. Jaeger. At the afternoon session talks were made by Kelvinator Service Manager E. A. Seibert, Refrigerator Discount Company General Manager C. M. Armstrong, W. D. McJunkin, President, and W. W. Garrison, Vice-President, respectively, of the McJunkin Advertising Agency of Chicago; Vice-President Jaeger, and H. A. Lewis, Kelvinator Treasurer.

An informal banquet was held in the Florentine Room of the Statler at 6:30 P. M., with speakers and entertainment by the Corine Muer Quartette and players. A feature of the banquet was a huge birthday cake with fifty lighted candles.

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Pioneer Patents Tell History of Enclosed Motor Type Machines

By H. R. Van Deventer

IN an article appearing in ELECTRIC REFRIGERATION NEWS (January 15th, 1930) reference was made to the Ross patent No. 1,195,269, filed Sept. 6, 1913, and patented August 22, 1916.

The specification of this patent is substantially the same as that in the original application. The claims as filed in the application are as follows:

1. A refrigerating machine comprising a circulating system for the refrigerant and including a pump, a motor for the pump, and a gas-tight housing means for both the pump and motor.

2. A refrigerating machine comprising a circulating system for the refrigerant and including a pump, a motor having its rotor connected with the shaft of the pump, and a gas-tight housing means for the pump and the rotor of the motor.

3. A refrigerating machine comprising a circulating system for the refrigerant and including a pump, a motor, a shaft connecting the rotor of the motor with the pump, a gas-tight housing for the rotor and pump, and bearings within the housing for the shaft.

4. A refrigerating machine comprising a circulating system for the refrigerant and including a pump, an induction motor for driving the pump, and a gas-tight housing for the pump and motor.

5. A refrigerating machine comprising a circulating system, including a pump, an induction motor, a connection between the rotor of the motor and the pump, and a gas-tight housing for the pump and rotor and said connection.

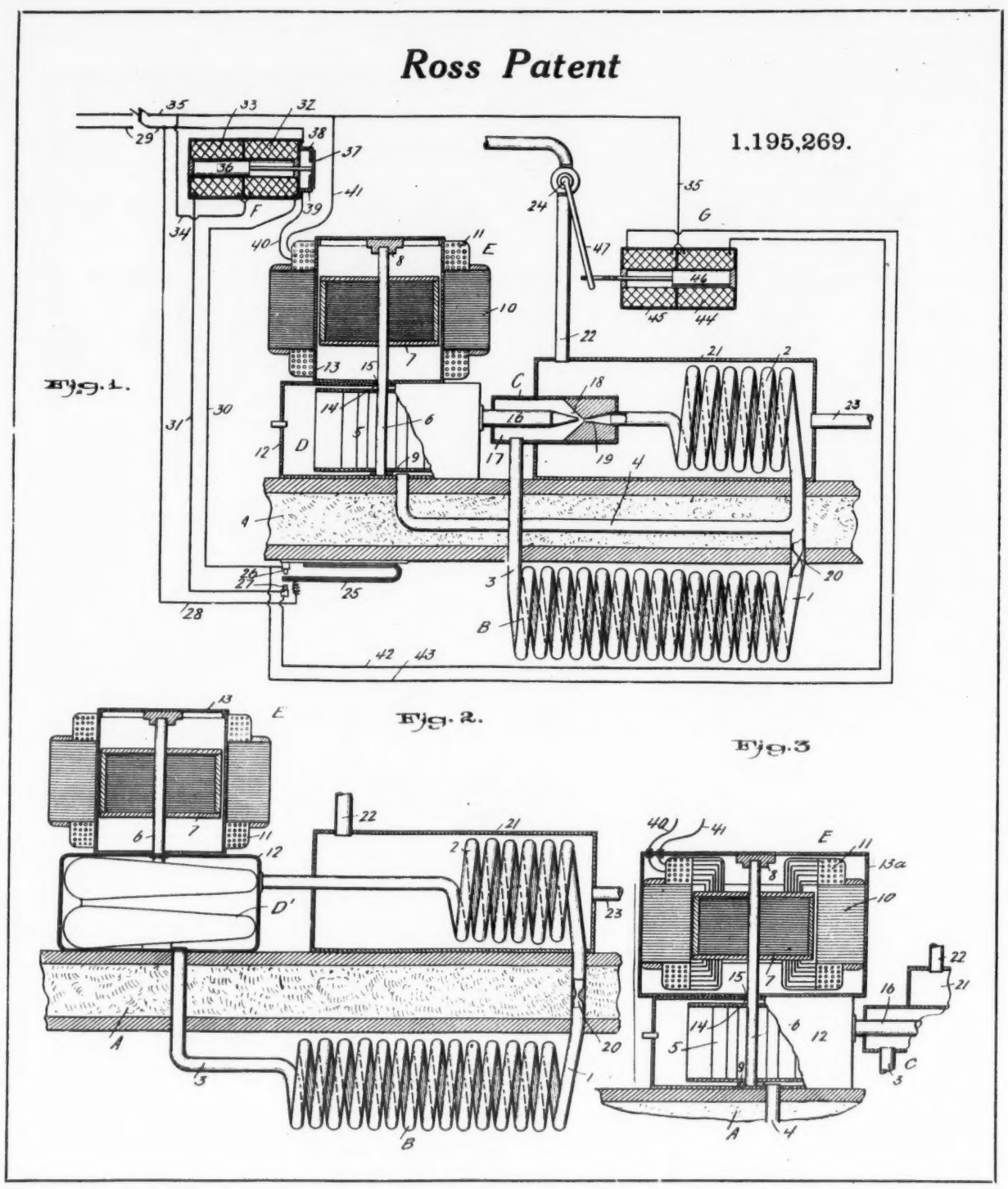
6. A refrigerating machine comprising a circulating system, including a pump, an induction motor having its rotary element connected with the pump, and a gas-tight housing enclosing the pump and the rotary and stationary elements of the motor.

7. A refrigerating machine comprising a circulating system, including a centrifugal pump, an induction motor for driving the same, and a gas-tight housing for the pump and motor.

8. A refrigerating machine comprising an expansion coil, a condenser coil, and a centrifugal pump for producing a circulation of refrigerant through the coils.

9. This claim in the application was the same as claim 1 now in the patent, except that the last word of the claim was "latter" instead of former, as now.

10. A refrigerating machine comprising a circulating system; including a condensing coil, an expansion coil and pump for producing the circulating of the refrigerant through the coils, in combination with an electric motor for driving the pump, means for supply a cooling medium to the condensing coil, a circuit closer for cutting the motor into and out of action, a device for controlling the supply of the cooling medium, and a temperature-responsive means for opening the circuit closer and said device for automatically stopping the motor and the supply of cooling medium, or starting the motor and the supply of cooling medium.



By an amendment of Sept. 6, 1913, before the application was acted upon, the following claim was inserted:

11. A refrigerating machine comprising a circulating system for the refrigerant, means for producing a circulation of the refrigerant through the system, and thermo-responsive means arranged to be effected by the said system to control the first-mentioned means.

By an action of January 27, 1914, claims 1 to 6, inclusive, were rejected on each of the following references: 577,328 and 597,532.

Claims 7 and 8 were rejected on each of those above, taken with German patent No. 233,122. It was held that there would be no invention in using a centrifugal pump in such a combination as applicant's in place of the reciprocating pump.

Claims 10 and 11 were rejected on each of 697,029 and 684,894.

Claim 9 was considered allowable.

By an amendment of December 19, 1914, claims 1 to 8 were cancelled.

Claim 9 was renumbered as claim 1.

Claim 10 was cancelled and there was inserted, as claim 2, the following:

2. A refrigerating machine, comprising a condensing coil, a cooling device connected with the coil and into which the refrigerant expands, and an aspirator connected with the receiving end of said condensing coil and connected with the said device for drawing off gas from the latter.

3. Claim 3 inserted was the same as claim 2 of the patent.

4. A refrigerating machine, compris-

(Concluded on Opposite Page)

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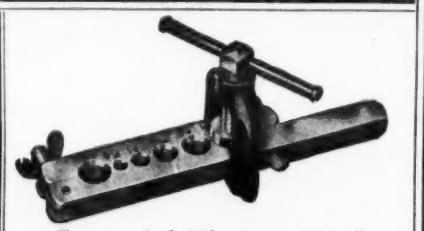

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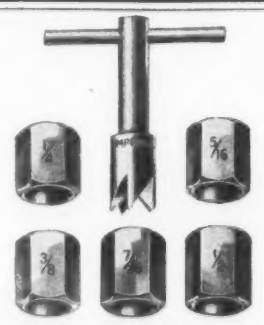
Gives the proper flare and taper to the tubing for making up joints. A perfect flare means a tight joint and this tool does the work in least time and with utmost simplicity. No loose dies — no vise necessary. No. 93-F takes tubing sizes 7/16", 3/16", ¼", 5/16" ⅜", and ½", each $3.00

No. 95-F takes tubing sizes ¼", 5/16", ⅜", ½" and ⅝", each $4.00



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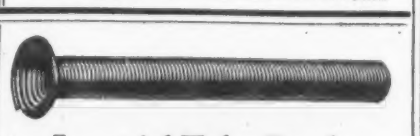
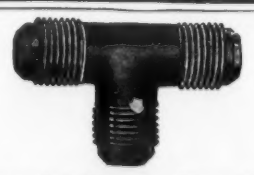
This new tool insures against leaks caused by S. A. E. couplings that do not seat properly. In use, the coupling is inserted into the correct adapter, then a few turns of the five-fluted hardened steel refacer produces a faultless seat of correct size and taper for a tight and leak-proof joint.

No. 100-F Refacing Tool with adapters for sizes ¼", 5/16", ⅜", 7/16" and ½". Per Set $3.75



Imperial Tube Bender

Just slip this tool over the tubing where the bend is to be made. Then bend both tube and coil by hand to whatever form desired. Seven Tube Benders comprise a complete set. No. 101F Tube Bender Set for tubing sizes ¼", 5/16", ⅜", 7/16", ½" and ⅝". Per Set $2.75



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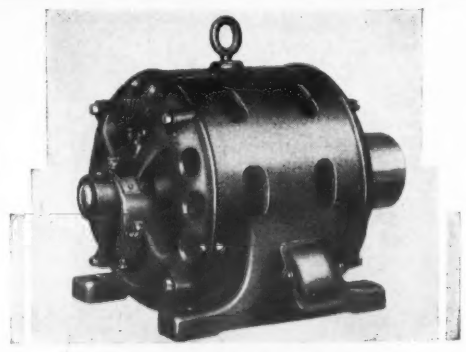

5 Horse Power Century Type RS
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Century Type RS Repulsion Start Induction Single Phase Motors are of the brush-lifting type. This assures long brush life because the brushes are in contact with the commutator only about 1/900th part of the time the motor is in operation. The governor, brush-lifting mechanism and short-circuiting device have been proved dependable during more than 26 years' use in all classes of service and in all climates.

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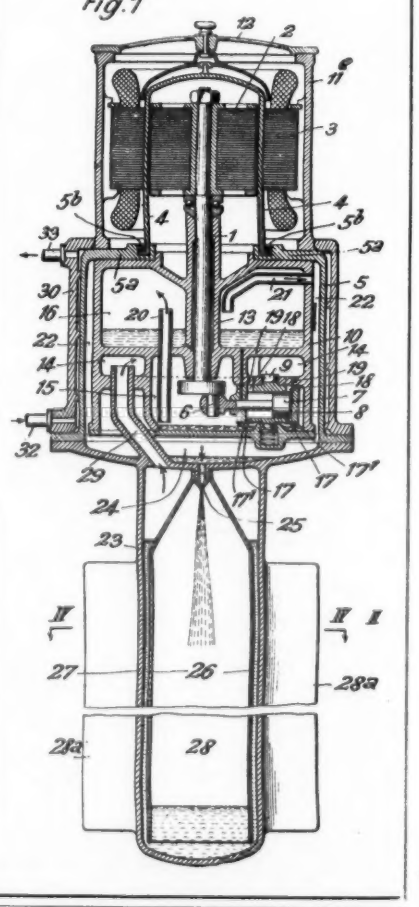
1,263,633.



PATENTS

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TRADE MARKS

PIONEER PATENTS

(*Concluded from Opposite Page*)

ing means in which refrigerant expands to produce coil, a condenser connected with the said means, a centrifugal pump connected with the said means for driving off the expanded gas, and a connection between the centrifugal pump and condenser for discharging the refrigerant thereto, and an induction motor connected with the rotating element of the pump, and a gas-tight casing enclosing the pump and rotor of the motor.

By an action of January 8, 1915, claim 2 was rejected on 258,227.

Claim 4 was rejected on the Singer patent of record, together with 1,046,588. It was held that there was no invention in substituting the rotary compressor shown in patent 1,046,588 for the type of compressor shown in Singer.

By an amendment of January 4, 1916 claims 2 and 4 were cancelled.

By an action of January 11, 1916, present claim 3 was rejected, the office indicating that the claim, submitted as claim 11, had previously been rejected and that no response on the part of the applicant had been made.

By an amendment of January 18, 1916, claim 3 was cancelled and the case was then allowed.

Figures 1 and 2 of the Ross patent show the stator only of the motor enclosed within the hermetically sealed casing, an arrangement that has come into commercial use in the Escher-Wyss machine previously referred to.

Figure 3 of the Ross patent shows the entire motor enclosed within the hermetically-sealed casing, which arrangement has come into extended commercial use in machines, such as the General Electric.

The chamber 12, enclosing the two-stage pump, is under suction and therefore the space about the rotor 7 in Figure 2 is also under suction.

Patents 577,328 and 597,432 to Singer cited as references against the Ross application have been referred to before, and are typical of the prior state of the art before Ross filed.

Another patent of general interest is No. 1,212,127, to Carpenter, filed August 31, 1915, and patented January 9, 1917. This patent is of interest as showing in Figure 7 a motor and compressor in a hermetically-sealed casing, the discharge pressure of the compressor prevailing within the casing.

The patent is of further interest as disclosing the idea of entraining lubricant in the refrigerant vapor passing to the compressor.

Another patent is No. 1,362,757, to Stokes, filed July 7, 1916, and patented December 21, 1920. This shows a motor and compressor in a hermetically-sealed casing, the compressor being of the reciprocating type and being directly connected to the motor.

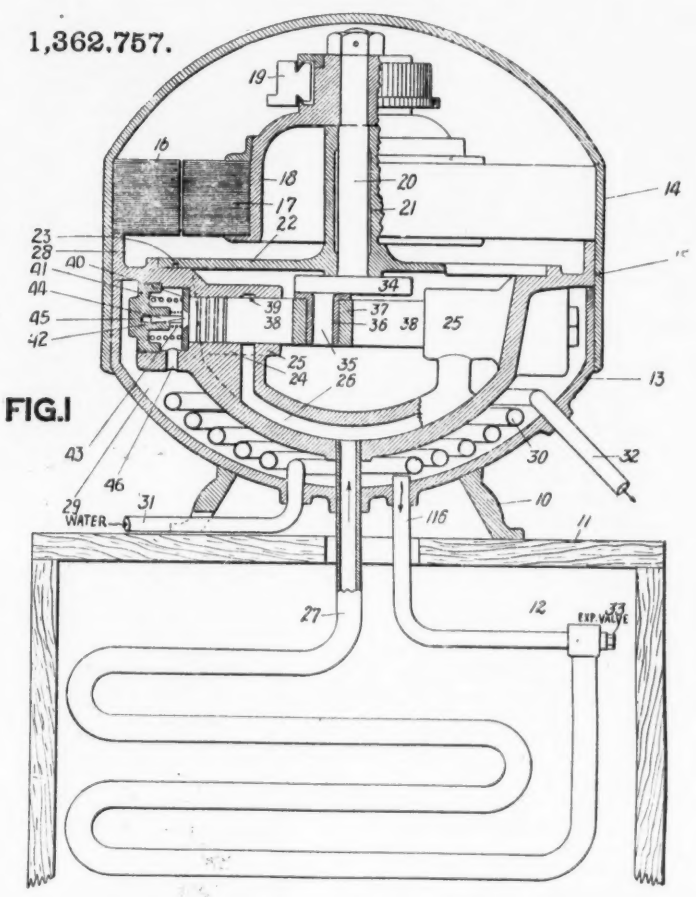
This patent differs from the Zoelly patent No. 1,263,633, in that the entire motor is enclosed in Stokes.

The cross-head 37 formed integral with the piston 38, and the entire arrangement of the two cylinders in the Stokes compressor is very ingenious.

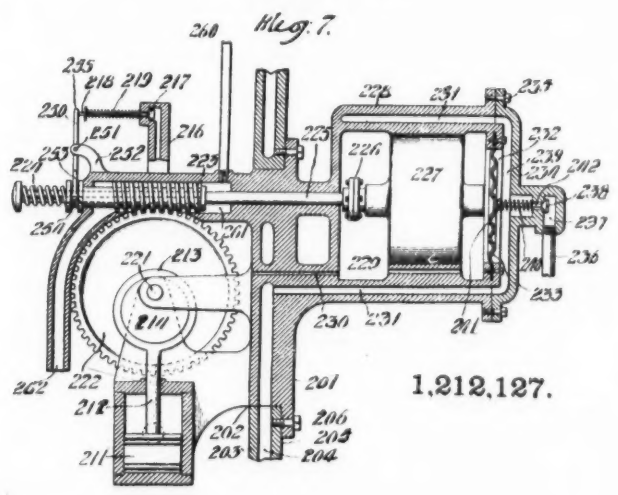
Stokes shows a water-cooled machine, and so far as can be determined it has never come into commercial use. While Figure 1 shows a commutator for the motor which would lead one to believe that direct current motor could be used, it is doubtful if an ordinary commutator and brushes could be employed in the gas chamber as shown in the patent.

Stokes

1,362,757.



Carpenter



1,212,127.

REFRIGERATOR FOR ODD FELLOWS' HOME

Birmingham, Ala.—The Odd Fellows' Home at Cullman, Ala., has installed a General Electric Commercial Model C-601. The installation and sale were made by the Matthews Electric Supply Company, of Birmingham, state distributers for General Electric.

NEW PATENTS

ISSUED SEPTEMBER 2

1,774,669—INTERMITTENTLY - WORKING REFRIGERATOR OF THE ABSORPTION TYPE. Ludwig Heinrich Reehsing, Bremen, Germany. Filed Mar. 10, 1928, Serial No. 260,669, and in Sweden Jan. 27, 1928. 6 Claims. (Cl. 62—120.)

1. In a portable refrigerating apparatus of the absorption type, in combination, a unit comprising a boiler, a condenser and a connecting pipe, pivot means for said unit, a box adapted to enclose said condenser, and a container adapted to enclose said box and said unit during transportation and to contain cooling liquid during operation.

1,774,705—LIQUID COOLER. Erik August Forsberg, Stockholm, Sweden, assignor to The De Laval Separator Company, New York, N. Y., a Corporation of New Jersey. Filed Nov. 14, 1928, Serial No. 319,414, and in Sweden Nov. 30, 1927. 4 Claims. (Cl. 259—75.)

1,774,820—REFRIGERATING SYSTEM. Samuel C. Williams, West Orange, N. J., assignor to Columbia Engineering & Management Corporation, New York, N. Y., a Corporation of Ohio. Filed July 31, 1928. Serial No. 296,486. 16 Claims. (Cl. 62—179.)

1. In a refrigerating system of the absorption type, an absorber for absorbing a gasified refrigerant, means for heating said absorber to distil the gasified refrigerant therefrom, and means for supplying a portion of the refrigerant so distilled from said absorber to said heating means.

12. A method of producing a refrigerating effect which consists in evaporating a liquefied combustible fluid, absorbing said evaporated fluid in an absorbent substance, and heating said absorbent substance to drive off the fluid absorbed therein by the combustion of a portion of the fluid so evaporated.

ISSUED SEPTEMBER 9

1,775,286—COMPRESSOR. Samuel W. Luitwieler, Los Angeles, Calif. Filed July 28, 1927. Serial No. 208,969. 4 Claims. (Cl. 230—185.)

1. A compressor comprising in combination a frame having a back wall, forwardly extending walls therefrom and a removable cover plate forming a chamber, a shaft journaled in the back wall and the cover plate, and having a cam thereon in the chamber, a pair of cylinders secured to the opposite sides of the forwardly extending walls, heads secured to said cylinders, pistons slidable in the cylinders being connected by a common yoke, interengaging means between the yoke and the said cam, an inlet to the chamber, the pistons having ports connecting to the chamber, check valves in the pistons, a removable tank secured in the said frame, and discharge outlets from the cylinder heads to the said tank, said discharge having check valves.

1,775,492—REFRIGERATING APPARATUS. Harry B. Hull, Dayton, Ohio, assignor to Frigidaire Corporation, Dayton, Ohio, a Corporation of Delaware. Filed Apr. 25, 1930. Serial No. 447,364. 7 Claims. (Cl. 62—116.)

1. A noiseless unitary refrigerator comprising a food compartment and a machinery compartment, said machinery compartment including a plurality of sound dampening walls, a refrigerating system in said refrigerator comprising an evaporator in said food compartment, a refrigerant circulating element connected to said evaporator and located in said machinery compartment, said circulating element including a compressor and a motor for driving said compressor, one of said walls having an opening for said machinery compartment for the circulation of air into and out of said machinery compartment, said opening being located in a wall of said machinery compartment to be placed adjacent a partition of the building in which the refrigerator is to be installed, and an imperforate sound dampening closure member on another wall of said machinery compartment for access to said refrigerant circulating element.

1,775,549—METHOD OF PACKAGING FRUIT JUICES. Clarence Birdseye, Gloucester, Mass., assignor to Frosted Foods Company, Inc., Dover, Del., a Corporation of Delaware. Filed Nov. 2, 1929. Serial No. 404,380. 9 Claims. (Cl. 62—170.)

1. The method of packaging fruit juices, which consists in filling a mold-supported bag of moisture-proof flexible material with fresh fruit juice, freezing the juice while so enclosed, removing the bag with its frozen contents in the form of a solid cake, and sealing the bag upon said cake.

ISSUED SEPTEMBER 16

1,775,744—COMBINED STRAINER AND CHECK VALVE. William Wishart, Clinton, Iowa, assignor to Climax Engineering Company, a Corporation of Delaware. Filed Dec. 21, 1925. Serial No. 76,678. 3 Claims. (Cl. 183—48.)

3. A strainer and check valve mechanism comprising a chambered housing, a refrigerant inlet pipe connected to said housing to communicate with one of the chambers thereof, a refrigerant head in another chamber of said housing, a discharge port in said housing communicating with said refrigerant head carrying chamber of said housing, an apertured sleeve projecting into the housing and communicating with said port, a shell within said housing connected with said sleeve, a plurality of spaced screens in said shell, packing separating said screens, an elbow pipe connected to said housing, and a control valve in said elbow pipe and mounted on said housing for governing the flow of a refrigerant through said exhaust port.

(*To be continued*)

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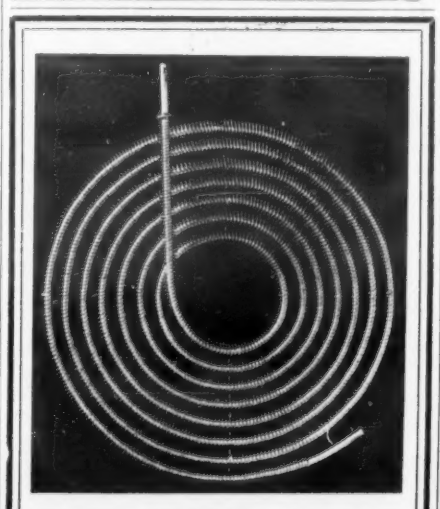

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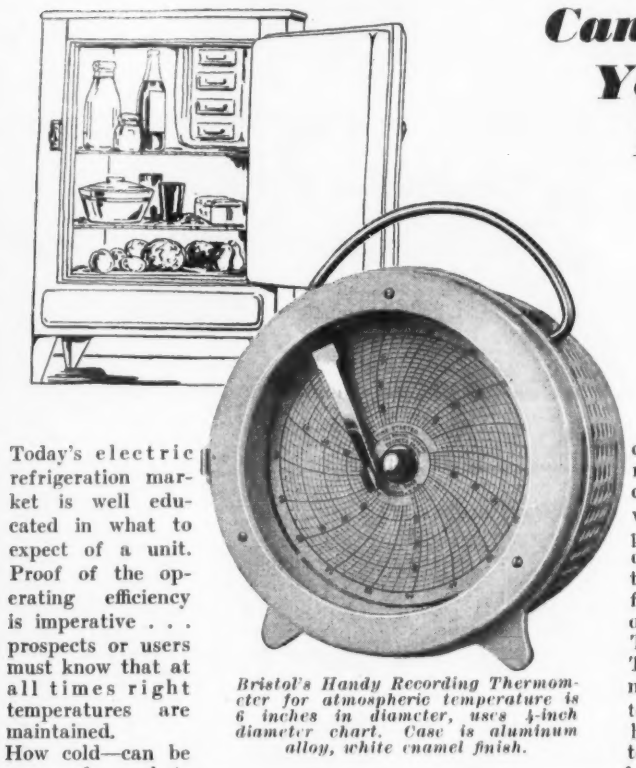
How Cool Is That Cooling Chamber . . .

Can You Really Tell?



Bristol's Handy Recording Thermometer for atmospheric temperature is 6 inches in diameter, uses 4-inch diameter chart. Case is aluminum alloy, white enamel finish.

Today's electric refrigeration market is well educated in what to expect of a unit. Proof of the operating efficiency is imperative . . . prospects or users must know that at all times right temperatures are maintained.

How cold—can be answered emphatically by placing in the cooling chamber Bristol's Handy Recording Thermometer. This instrument, with the continuous 72-hour record, automatically records any variations in temperatures which occur, and writes the complete refrigeration story on the chart.

The Recording Thermometer furnished calibrated to use with chart having range of 30 to 70° F., has been found to be most suitable for refrigeration requirements. Instruments made up this way are carried in stock for prompt shipment.

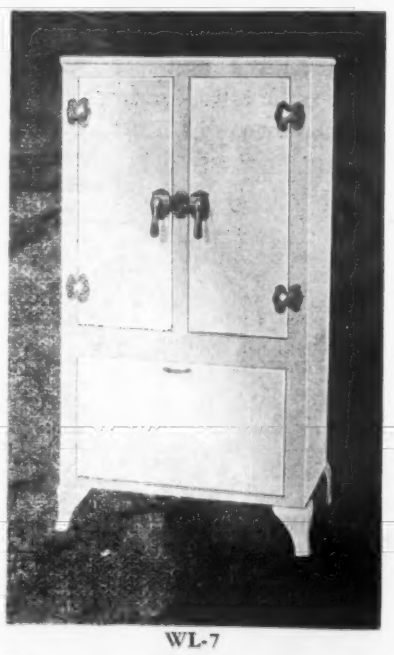
For further detail, description and prices, write for Bulletin No. 377

THE BRISTOL COMPANY

WATERBURY, CONN.

STARR FREEZE

Electric Refrigerators



WL-7

REAL QUALITY *at* LOW PRICES

The

STARR FREEZE

is

POWERFUL . . .

QUIET . . .

ECONOMICAL . . .

DEPENDABLE

and has the features the market demands.

Two Outstanding Models

WL-7 — 7 foot Capacity — Two Doors $149.00 List

F. O. B. Factory

WL-5 — 5.1 foot Capacity — Single Door $135.00 List

Write Us For Descriptive Literature of Other Styles and Territory Allotment.

THE STARR COMPANY

RICHMOND, INDIANA

NORGE IS ON PRIZE LIST WITH FORD AND DIAMONDS

Milwaukee, Wis.—In two large business-getting campaigns on the north side of the city, here, the Norge electric refrigerator is receiving splendid advertising, all without cost.

On the busy shopping street, Green Bay Ave., the Green Bay Avenue Advancement Association is conducting a gift campaign, ending Dec. 24, with the second main prize a Norge refrigerator. First prize is a new Ford car. It is not a contest that is being held, as no puzzles are to be solved, or no correct answers required in some guessing game. It is merely a method which a group of merchants are using to stimulate business. Thousands of advertisements have been and will be distributed to the residents of the district calling attention to the compaign. Winners will be chosen from coupons awarded for each 50-cent purchase made. Stubs will be drawn by a committee of prominent residents, all members of the association.

In another somewhat similar method the Liberty State Bank, 3rd and Center Streets, is celebrating its first anniversary in its new building, and is going to distribute $2,400.00 in merchandise to people who make a savings deposit of $5.00 or more between now and Dec. 24. For each new five-dollar deposit a coupon will be given, and these will be drawn during the holidays. First prize is a new Nash, the second a $250.00 diamond ring, and the third a Norge Sentinel refrigerator, valued at $171.00. The bank has distributed throughout the city a brochure explaining the campaign, and main prizes are illustrated by photographs. The Philip Gross Hardware Co. is local distributor.

TULSA COPELAND OUTLET CHANGES HANDS

Tulsa, Okla.—The Tulsa Copeland Refrigeration Co., 800 S. Main Street, has been purchased by M. E. Way, Inc., of Oklahoma City. A line of Bosch radios will be added, for which the Oklahoma City company is state distributor. The Tulsa company has state distribution for Copeland refrigeration.

No changes in the personnels of various departments will be made here, except that increases are probable in each department, according to George Mahaffy, manager.

Mahaffy, who has had charge of the business the last year, will continue as manager. Forty dealer agencies for land refrigeration are maintained over the state.

M. E. Way, Inc., automobile accessory and radio dealers at Oklahoma City, have approximately the same number of dealers for Bosch radios throughout Oklahoma.

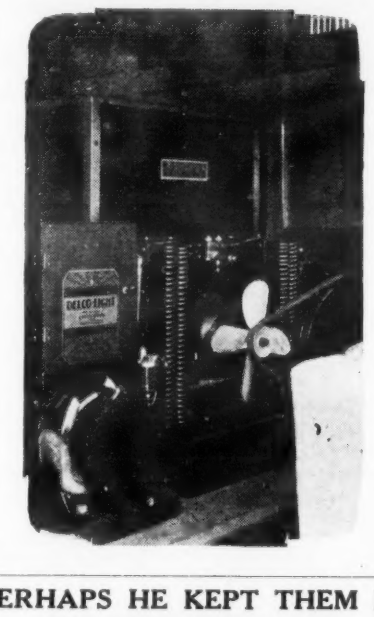
The name of the Tulsa firm has been changed to that of the new concern. M. E. Way is president and R. L. Williams is state radio manager.

H. O. Bland, Tulsa attorney, was president of the selling company.

FILTRINE EXPANDING IN CALIFORNIA

Los Angeles.—George R. Pizzaro of this city has recently been appointed factory representative for Filtrine products, including the new line of Filtrine high-capacity coolers and the complete line of water filters for domestic and commercial use.

Perambulating Popsicles



(Left) Frigidaire and Delco co-operate to cool the popsicles

* * *

Salt Lake City, Utah—Popsicles for the kiddies in the southeastern portion of the state of Idaho have been made possible by an installation completed by the Electric Light & Refrigeration Co., Frigidaire distributors for this section. A one-and-one-half ton Chevrolet truck has Frigidaire and Delco equipment sufficient for maintaining a temperature near the zero mark in the ice cream cabinet.

To adapt the truck to refrigeration it was necessary to use a Model 8A3-5R Delco-Light plant for generating the power for operating the motor of the condensing unit. A one-half horsepower, Model C Frigidaire compressor is hooked up to a twelve-hole Frigidaire ice cream cabinet, which is arranged for handling the popular frozen sweets.

PERHAPS HE KEPT THEM IN HIS REFRIGERATOR

Omaha, Neb.—Since the attorney-general of Nebraska shut down on betting on horse races at the Ak-Sar-Ben grounds adjoining Omaha, the sports have been hard put at times to find amusement. The terrapin races were held the first of the month, and all lovers of sport entered their turtles. J. L. Baker, president of the Baker Ice Machine Company of Omaha, was not to be outdone, so had three supposedly thoroughbred racing terrapins sent him from Florida.

They came through all right and were put in training for several days and duly entered in the race, but refused to speed at the right time.

TENTH BRANCH STORE OPENED BY HOLBROOK

Stockton, Calif.—Holbrook, Merrill & Stetson, Inc., Ltd., will establish a factory branch here in remodeled quarters at 311 West Weber Avenue, the branch to be in charge of J. D. Hubbard, connected with this firm for 12 years past at its Sacramento sales offices. The Stockton territory will comprise central California, heretofore served from the Sacramento offices. Both domestic and commercial Holbrook electric refrigerators will be distributed. The Stockton branch will be the firm's tenth, the others being located in Pasadena, Long Beach, San Diego, Los Angeles, Fresno, San Francisco, Sacramento, Seattle and Oakland.

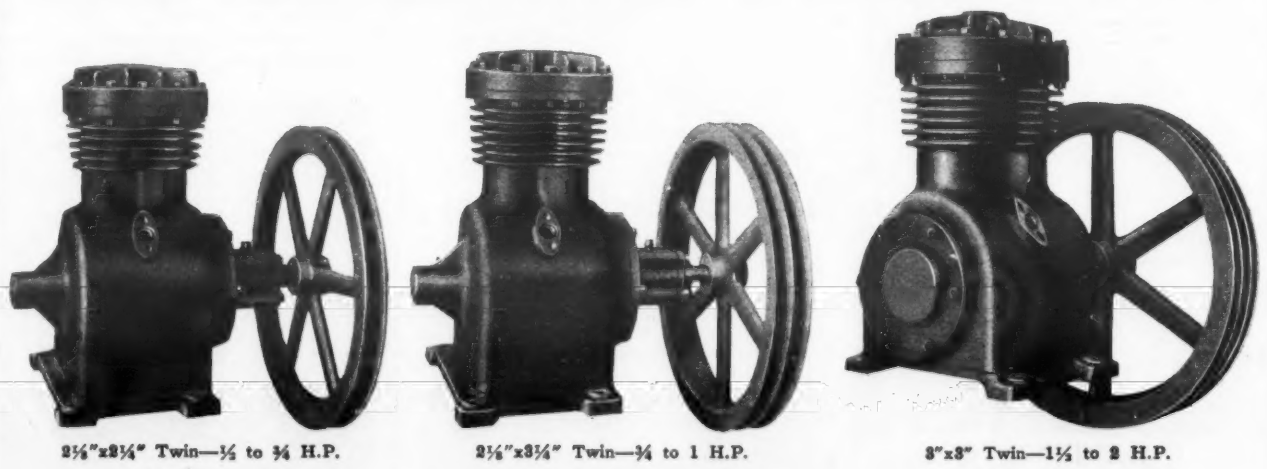
LARGER TERRITORY FOR TEXAS COMPANY

Beaumont, Tex.—Announcement has been made of the appointment of the Neches Electric Company of Beaumont, Texas, as distributors for Kelvinator refrigeration for all of Texas south of Georgetown and extending west to the New Mexico state line, with the exception of the properties of the El Paso Electric Company.

A branch has been established at San Antonio to take over the territory formerly served by the Southern Equipment Company. The San Antonio branch is in charge of Paul S. Wells and headquarters have been established at 217 Main Avenue. This branch, which serves as both wholesale and retail outlet, has taken over the franchises of the Southern Equipment Company, wholesale distributors, and the Graham-Collins Electric Company, retail sales outlet. Service and sales departments have been established and the new Yukon models placed on display.

R. A. Prather is sole owner of the Neches Electric Company, which is the oldest Kelvinator distributor in the state of Texas.

Sulphur Dioxide Compressors



2½"x2¼" Twin—½ to ¾ H.P. 2½"x3¼" Twin—¾ to 1 H.P. 3"x3" Twin—1½ to 2 H.P.

A complete new series of Sulphur Dioxide Compressors for the commercial refrigeration field. Built by the pioneer refrigeration manufacturing firm of the Pacific Southwest. All castings and machined parts are made and assembled at the PARKER factory.

Factory 943 Third St. San Bernardino, Cal.

MANUFACTURED BY

Parker Ice Machine Co.

ESTABLISHED 1899

Factory 2600 Santa Fe Ave. Los Angeles, Cal.

Salesmen Flock to Fall Meetings as Big G. E. Circus Rolls Into Town

Newark, N. J.—Two hundred persons attended an all-day business convention and outing conducted by Philip H. Harrison & Co., distributors of General Electric refrigerators for northern New Jersey, Sept. 25, at Mazdabrook, Parsippany. The program was conducted like a circus, with a large tent as the meeting place. A parade was a feature. Instead of the usual lectures, the business messages were conveyed to the audience through skits.

Addresses were made by A. A. H. Uhalt, general field specialist of the refrigeration department, General Electric Company, and by Mr. Harrison. A buffet luncheon was served. The distributor's baseball team defeated the dealers, 8 to 5.

A picturesque feature was the complete fleet of the distributor's trucks completely loaded for daily deliveries. An interesting announcement was made at the convention to the effect that the General Electric Company and its distributors had decided to continue their policy of making no charge for service on General Electric refrigerators for an indefinite period.

A banquet was served at night. W. J. Daily, advertising and sales promotion manager of the refrigeration department in Cleveland, spoke.

The details of the circus were arranged by F. H. Driscoll and T. E. Babson, of the distributors' organization. The convention broke up at a late hour.

Prizes for the highest number of part-payment sales made during July and August were presented to Axel Ornberg, of Red Bank, and Mrs. Baldwin, of Montclair.

CANTON

Canton, Ohio.—The Willis Company, distributor of General Electric refrigerators in 14 counties of eastern Ohio and western Pennsylvania, entertained 300 dealers and salesmen at the annual fall convention held at the Courtland Hotel, Canton, Monday, September 29.

This meeting, a live-wire affair, inaugurated the "On the Top Sales Campaign," which, known as the G. E. Circus Train, will continue from October 1 to December 9. Willis salesmen and dealers are pitted against the Bogart crew of Toledo, and competition promises to be keen, as the dealer that gets his quota first in moving the "Circus Train" toward his opponent's territory, will receive 5% of the competition prize.

The convention was opened by a welcoming address from Dan Willis, chairman of the affair. Willis also introduced the actors in a skit, "Follow Through," which, in pantomime, showed how a reluctant old-fashioned grocer can be induced to buy an electric refrigerator by sure-fire, live-wire salesmanship. A debate, "Resolved, that it is possible for the retail salesman to sell electric refrigeration in winter," resulted in a landslide decision for the affirmative. The Toppers' Club, in their high hats and canes, were introduced and the Circus Train contest explained by E. M. Diehl, when the convention repaired to the ballroom of the hotel, which had been transformed into a circus lot with stuffed animals and side shows. Following dinner, W. E. Landnesser, commercial sales manager of the G. E. of Cleveland and Schenectady, gave a talk on "Achievement," which was broadcast over WHBC. The day's program ended with a circus parade including the 300 salesmen and dealers, who marched to Loew's Theatre, where a section had been reserved for them for Eddie Cantor's "Whoopee."

DAYTON

Dayton, Ohio—The Dayton General Electric refrigerator organization, under the direction of F. P. Lutz, local distributor, expects to get more than its share of business in the ten-weeks' drive for $20,000,000 in sales conducted by the company, it was announced at a meeting of the entire Dayton district organization Sept. 29.

H. W. Shelby, wholesale sales manager of the Lutz Company, presided at the session, which was attended by some 50 dealers and salesmen. The campaign for $20,000,000 of new General Electric business is nation-wide and is known as the "On the Top Circus" contest, with salesmen acting as "performers." To give the circus atmosphere to the campaign, various circus acts were presented at the meeting. Contest manager for the Dayton territory is Earl F. McClintock, assistant manager of the F. P. Lutz Company.

EVANSVILLE

Evansville, Ind.—General Electric dealers in southern Indiana and western Kentucky marked their entrance into General Electric's $20,000,000 nation-wide "circus" sales campaign on Sept. 25 with a dinner and sales promotion meeting at the Hotel McCurdy. Sixty persons attended the conference.

Addresses were made by L. H. Miller, president; Fred. Nobbe, assistant sales manager; Arthur Wigert, commercial sales manager, and M. Nerron, sales manager, all of the Electric Refrigeration Company, Louisville, Ky., distributor. A. F. Davis, manager of the Electric Refrigeration Company branch here, was in charge of program arrangements.

NEW YORK

New York, N. Y.—More than one thousand members of the organization of Rex Cole, Inc., New York distributors for General Electric refrigerators, attended the annual fall sales meeting held October 9 in the Grand Ballroom of the Commodore Hotel.

A conference of sales directors, dealers and department managers was held in the morning at Rex Cole, Inc., 265 Fourth Avenue, while the large gathering started in the afternoon at the hotel. The afternoon session was followed by a banquet. Evening entertainment included a program by the Rex Cole Mountaineers, famous radio entertainers, and dancing.

MADISON

Madison, Wis.—D. S. Stophlet, Inc, local distributor for General Electric refrigerators, held a meeting at the Park Hotel here October 1 in connection with the "On the Top Circus" contest. Approximately 60 dealers and salesmen from the Madison territory attended the gathering.

Speakers at the meeting were R. G. Walter, division manager; M. H. Frank, assistant to the vice-president, and L. M. Williams, all of the Wisconsin Power and Light Co., and E. R. Felber, merchandising manager of the Madison Gas and Electric Co.

MIAMI

Miami, Fla.—About forty distributors, dealers and salesmen attended the banquet which brought to a close the south Florida sales convention and regional conference of the Florida Electric Refrigeration Co., distributors of General Electric refrigerators, held on Sept. 24.

Three other regional meetings were also held: one at Orlando, one at Tampa, and the third at Jacksonville.

CINCINNATI

Cincinnati, Ohio—The Milnor Electric Refrigeration Company of Cincinnati, distributor of General Electric refrigerators, held its annual fall and winter sales meeting at the sales rooms, 129 Government Square, Tuesday, Sept. 30. Sales and advertising plans, as well as sales-demonstrating devices, were discussed at this meeting.

THE BIG FOUR

New York, N. Y.—Among outstanding sales of the apartment house department of Rex Cole, Inc., metropolitan distributors for General Electric refrigerators, were those made by Herbert G. Bancroft, Chas. Witherspoon, Alex Fried and Sig Eiman, who took orders for a total of 649 machines.

Witherspoon led the quartette with 165 installations for various Queens apartments; with Bancroft second with a total of 261 refrigerators for Manhattan delivery. Fried had a single order for 109 machines for installation in a Flushing building.

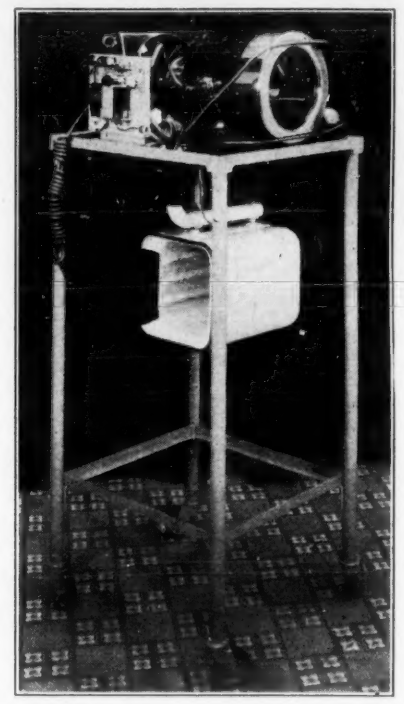
WESTINGHOUSE PRODUCES SPECIAL EXHIBIT MODEL

Atlantic City, N. J.—Visitors to the Westinghouse National Exhibit, on the Boardwalk, will see a super-deluxe cutaway unit, recently completed by the Westinghouse Refrigeration Engineering Department, Mansfield, Ohio.

This unit is not charged with refrigerant, as many parts of it are sectioned, but the motor, fan and all moving parts operate. The compressor end of the housing has the usual end-head replaced by one of glass, showing the action of the compressor, unloader and oil thrower. The opposite end of the housing is cut away in quarter section, and shows the construction of the magnetic fan, and also the motor rotor.

The evaporator and expansion valve are also shown in section. Thus, the tubing containing refrigerant, wound about the inner shell of the evaporator, is exposed. It is also possible to study the expansion valve.

Special attention is given to the appearance and finish of this display model. The fan shroud, glass end-head, and many other parts are chromium-plated. The compressor has a smooth coat of black, high-gloss auto enamel, and the stand is finished in gray lacquer. Cut sections are red. The condenser, receiver and tubing are of gold bronze.



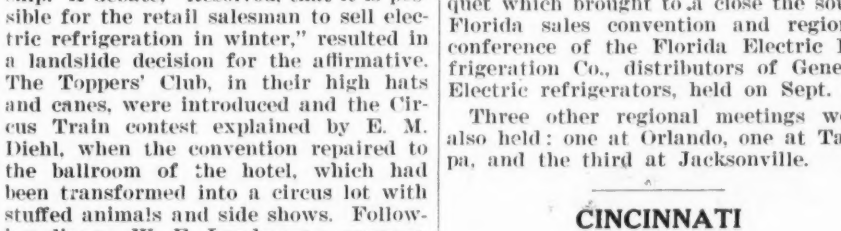
NEW DEALER TO COVER PITTSFIELD DISTRICT

Pittsfield, Mass.—The Electric Device Company, Springfield, Mass., distributor of General Electric refrigerators, has appointed the Berkshire Electric Appliance Company dealer for Pittsfield and surrounding towns, including Dalton, Hinsdale, Lanesboro, Richmond and Lee.

The Berkshire Electric Appliance Company has leased quarters in the new Y. M. C. A. Building at 280 North St., Pittsfield.

The Berkshire Electric Appliance Company is a new organization, and those interested in the company are Howard J. Bowles, Harold F. Harder and George H. French, the last named being president of the Electric Device Company. Mr. Bowles will have active supervision of sales. Messrs. Senger and Verchot, formerly with the merchandising department of the Pittsfield Electric Company, have been engaged as sales representatives.

THERMOMETERS



Mercury or Red Spirit — for your Service Department

CARROLL GLASS INSTRUMENT CO., Philadelphia, Pa.

Iceless Refrigeration Accessories Co., 2401 Chestnut St., Philadelphia. Hart Refrigeration Service, 308 Fairfield Ave., Bridgeport, Conn. Refrigeration Service, Inc., 3109 Beverly Blvd., Los Angeles, Calif.

6 outstanding features of . . .

PENN TYPE 'J' UNIT CONTROL

1 ONE DIAL CONTROL . . . . . .

2 TEMPERATURE SELECTOR . . . . . .

3 THERMAL OVERLOAD PROTECTOR . .

4 START AND STOP FOR DEFROSTING . .

5 RANGE AND DIFFERENTIAL ADJUSTER .

6 SIMPLICITY—LOW INSTALLATION COST

IN recognition of the outstanding engineering craftsmanship found in the Penn Type J Unit Control, several of the largest and best known manufacturers of electric refrigerators have adopted it as standard equipment. To keep pace with this fast moving, modern industry, investigate Penn Type J at once. Learn how it will simplify the control of your machine. Add to its salability. Reduce service calls. Send immediately for full information and complete specifications.

PENN ELECTRIC SWITCH CO.
DES MOINES, IOWA

MAINE GENERAL HOSPITAL EQUIPPED BY FRIGIDAIRE

Portland, Me.—Electric refrigerating equipment is included in the $900,000 development program of the Maine General Hospital of this city, which is now approaching completion. Both the seven-story addition, a large part of which will be ready for occupancy this year, and the old building, are being equipped with Frigidaire units.

The contract to install electric refrigerating equipment in the hospital was awarded to the local Frigidaire distributors, William B. Ward, manager.

The equipment in the new wing includes two AP9's, complete; two 20-pound ice makers with two M compressors; two AH under counter cabinets and one AP 72, complete.

In the dairy refrigerating storage room of the original building the following apparatus will be installed: seven 5-70F coils, two 5-16F coils, one 60-pound ice maker, two C compressors, one CO and one M compressor.

Two 12-78F coils and one C compressor are being installed both in the salad refrigerator and the garbage storage plant. One AP-72 cabinet will guard the provisions of the first floor diet hall, and an AP9 cabinet and two AH2 under-counter cabinets with a Y compressor will be installed in the nurses' dining room. A bulk ice maker completes the equipment in the remodeled building.

AUTUMN SALES SPUR ON COAST FRIGIDAIRE MEN

San Francisco.—The branch manager, sales manager, and education supervisor of the Frigidaire Corp. in Seattle, Portland, Los Angeles, Oakland and San Francisco, met in the Oakland offices of the corporation on Saturday, September 28, and discussed the fall sales campaign for the Frigidaire. The firm expects autumn sales to be particularly good on its "G" model cabinet, recently introduced for the medium-price trade.

The San Francisco sales offices, at 16th and Harrison Streets, report several noteworthy installations during the past few days. The U.S.S. "Henderson," which came into the San Francisco Bay the latter part of September, has purchased two new Frigidaire water coolers, one being for the officers' mess room. The first Frigidaire installation on the "Henderson" was two years ago.

E. R. Spinden, who owns the three Taste Good Bakeries in San Francisco, has had them all equipped, installing salad cases, water coolers and pastry display cases.

Phil. Harris, owner and builder of apartments, who has completed another structure at the corner of Pierce and Hayes Streets, has also equipped every apartment with a Frigidaire.

The Glide Foundation, erecting a church and apartment structure in San Francisco, has installed Frigidaires in its kitchens, its apartments, and in the recreation halls.

At the San Francisco Food Show, now being held in the Civic Auditorium from October 4 to 11, inclusive, the Samark & Company has installed a large Frigidaire cabinet to dispense ice cream and Eskimo pies.

OIL HEATERS CLOSE UP GAP IN SALES SCHEDULE

Cleveland, Ohio—For the electric refrigerator dealer who contemplates entering the home heating field to round out the income of his sales force, but who may regard the oil burner business as too great an undertaking, or for dealers who operate in suburban or rural communities,—circulating heaters of the so-called "cabinet" type using furnace oil for fuel, offer opportunities that should not be overlooked, says Norman E. Olds, advertising manager of the Perfection Stove Co.

The circulating heater involves no installation problem whatsoever, for it is placed in the living room, and the only connection is with ordinary smoke pipe to the chimney of the house.

The Superfex circulating heater may be placed in the living room or any central part of the house. It has no motors, belts, gears or moving parts. A patented fire-pot, constantly fed with only a small amount of oil at a time, and a self-controlled flow of air, provide combustion. There are no drafts or dampers to operate. Carbon is disposed of by means of a built-in scraper.

A five-gallon reversible lift-out reservoir on the back of the heater may be filled outside of the room while the heater is in operation. It may also be connected with an outside fuel tank if desired.

The heating unit is encased in a steel jacket, with a wall of air between it and the outside wall. This air, between the heater and the jacket, heats rapidly and rises through the top of the heater into the room, while allowing cool air to enter the bottom, thus providing constant circulation. A humidifier, built into the heater, maintains the proper moisture content in the air.

ROWAYTON ROSES

South Norwalk, Conn.—A Kelvinator refrigeration plant is being built for the Rowayton Rose Company in Rowayton. This system is reported to be one of the largest used by florists in this state. It has three control points for various degrees of freezing.

THREE NEW DISTRIBUTORS ADDED TO SERVEL'S LIST

Chicago, Ill.—The Electric Refrigeration Sales Company, 4346 North Avenue, has recently signed a contract for the distribution of Servel commercial machines in the Chicago area.

This firm has been in business for more than ten years, and up to the present time has confined its activities to the sale of heavy duty refrigerating machinery.

Officers of the firm are Walter E. Moss, president; T. C. Johnson, vice-president; R. T. Johnson, secretary, and H. G. Swart, treasurer. H. Swart and E. Johnson coöperate in management of sales for the company.

Buffalo, N. Y.—The Mollenberg-Betz Machine Co., Inc., a firm that has been engaged in the installation and sale of heavy refrigerating machinery for nearly forty years, has recently been appointed distributors of Servel commercial units in Buffalo and vicinity.

The founders of this old established Buffalo firm, Henry J. Mollenberg and Jacob Betz, are still active in its management, Mr. Mollenberg serving as president, and Mr. Betz as secretary-treasurer. Harold J. Mollenberg, sales manager, will also be in charge of Servel sales in the Buffalo area.

In addition to the sales, installation and service of heavy duty refrigerating machinery, the firm operates an up-to-date machine shop, specializing on heavy job work for local firms and railroads.

Milwaukee, Wis.—Advance Refrigeration Co., Inc., of 2566 Fond du Lac Ave., has recently signed a contract for the sale and distribution of Servel commercial machines in Milwaukee and vicinity. The Servel line will supplement the firm's business on heavy duty refrigeration, in which they have been engaged for nearly twenty years.

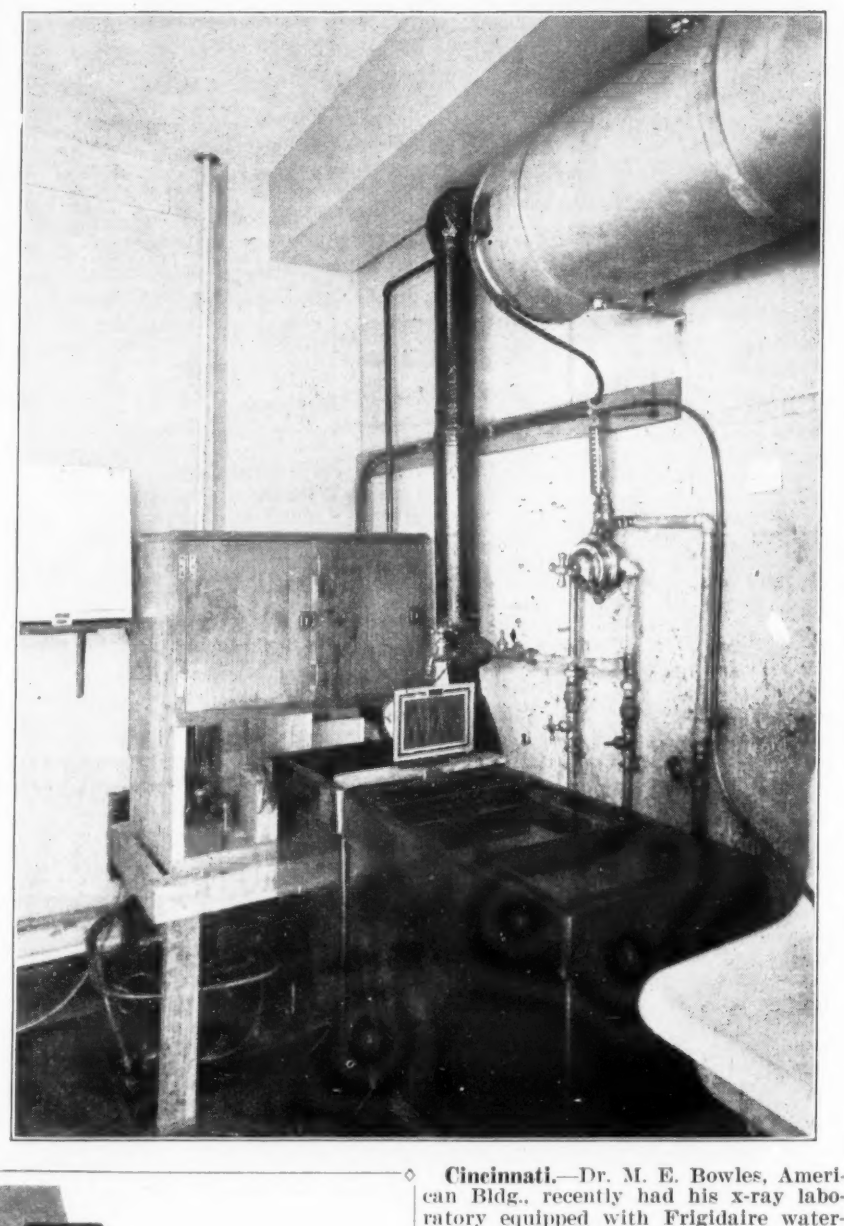
Sales in the city of Milwaukee will be handled through the present retail sales force, and dealers will be appointed to handle the line in the outlying Milwaukee territory.

A. J. Radke is president of the company; E. J. Gebhardt, vice-president, and E. J. Radke, secretary-treasurer.

SWIFT LUMBER CO. TO SELL FRIGIDAIRE

Omaha, Neb.—The Swift Lumber & Fuel Co., of Lincoln, has been made Frigidaire dealers in Lincoln and Lancaster counties. Offices have been opened in the Star Building.

Refrigeration for X Ray Work



Cincinnati.—Dr. M. E. Bowles, American Bldg., recently had his x-ray laboratory equipped with Frigidaire water-cooling equipment.

As many as 300 films a day are developed in Dr. Bowles' x-ray laboratory. The Frigidaire insures a perfect temperature for developing solutions and brine baths.

MEMPHIS PLANS WELCOME TO PRACTICAL ENGINEERS

Memphis, Tenn.—The National Association of Practical Refrigerating Engineers will come south for its twenty-first annual convention and educational exposition, November 11 to 14, inclusive, meeting in the Municipal Auditorium here.

Since the last Memphis Convention in 1923, a new two-million-dollar auditorium, with not only a meeting hall, but a space for the convention exhibition, and Hotel Peabody have been built.

All business meetings of the convention will be held in the Concert Hall of the Memphis Municipal Auditorium. The exposition, consisting of 58 booths, covering a total of 6,000 square feet of floor space, will be housed in the north and west halls of the same building, where will be exhibited refrigerating machinery equipment and accessories. The Hotel Peabody will be convention headquarters.

Opening on November 11, Armistice Day, the educational program that constitutes the main convention business will begin in earnest on Wednesday morning, November 12. Discussion of air conditioning, multiple effect and its applications, lubrication, foodstuffs, rebuilding ice manufacturing plants to obtain lower operating costs, and of Diesel engines for refrigerating and ice-making plants, will take up most of the day. The annual banquet and ball which will take place in the ballroom of the Peabody that evening.

The educational program of the convention will continue Thursday morning, and at one o'clock in the afternoon members of the Tennesse Chapter No. 1, under the direction of Secretary Chas. A. Conley, will guide the visitors on a sight-seeing trip to the major points of interest of Memphis.

After 6 p. m. there will be the Exhibitors' Frolic, followed by dancing.

Regular convention business will be resumed on Friday, November 14, with the reading and discussion of final papers on such subjects of interest to convention members. The selection of the convention city for 1931 will conclude the convention late Friday afternoon.

COPELAND CHOSEN FOR SPOKANE APARTMENTS

Spokane, Wash.—Three apartments are being equipped with Copeland electric refrigeration in Spokane, under the supervision of C. M. Anderson, manager of Harper-Meggee, Inc., South 122 Lincoln Street, Spokane.

An exclusive apartment, as yet unnamed, is being equipped with a multiple system. Five different style boxes are being used, including de luxe boxes in the larger apartments.

The Carlyle Apartment Hotel is being equipped with 18 individual units. Another apartment operated by the owners of the Carlyle is also being equipped with individual units.

LITTLER NOW WITH MURRAY-HOLBROOK

Seattle, Wash.—Formerly associated with the Copeland division of Harper-Meggee, L. D. Littler is now with the Murray-Holbrook Company, Terminal Sales Building, Seattle, distributors of the Holbrook automatic electric refrigerator. Mr. Littler, with L. W. Harris, heads the apartment house sales division of the Seattle Holbrook organization, offices of which were only recently opened in Seattle. Before joining the Harper-Meggee organization, Mr. Littler was with Gordon Prentice, Inc., of Seattle, distributors of General Electric refrigerators.

They Will Not Melt
Realistic Food Products
A complete assortment especially designed for refrigeration display.
27 ARTICLES FOR $20.00
Realistic Food Products Co.
266 Fabyan Place NEWARK, N. J.
Special Representative:
G. R. PIZZARO, Los Angeles, Cal.

Filtrine
Guaranteed **FILTERS** for Electric Water Coolers. *Pure, Clear Water.*
FILTRINE
MANUFACTURING COMPANY
49 LEXINGTON AVE. Brooklyn, N.Y.
Manufacturers of FILTERS & COOLERS of all sizes.

KEROTEST
forged brass
MANIFOLDS

A difficult problem for the service manager has been solved with this Kerotest seamless type of Manifold equipped with Angle Valves permanently screwed and soldered 2 inches between centers as illustrated.
These square end tubes can be obtained in 2, 3, 4, 5, 6, 10 and 30 valve lengths, tapped on the ends for ⅜-inch pipe. Valves fitted with Wing Nut Seal Caps, or Packless Valves if you prefer.
Detailed specifications and quotations sent upon request.
KEROTEST MANUFACTURING CO. · PITTSBURGH, PA.

Absopure
ELECTRIC FRIGERATOR
12 HOUSEHOLD MODELS
All porcelain and porcelain-lined. From 4.3 to 32 cu. feet capacity.
COMPLETE COMMERCIAL LINE For Meat Markets, Grocers, Florists, Apartment House Multiple
THE Absopure franchise is an asset whose value will increase as refrigeration comes into its own. Some territory is still open. For details—write or wire the factory.
Absopure
Refrigeration Corporation
1560 Theodore Street
DETROIT - - MICHIGAN

precision built
Specializing in
Refrigeration Compressor
Eccentric *and* **Crank Shafts**

Made to your specifications.
Send us your blueprints —we'll send you our prices.
MODERN MACHINE WORKS, INC.
195 MILWAUKEE ST., DEPT. C
MILWAUKEE, WIS.

PRODUCTION UNDER WAY AT MAJESTIC FACTORY

(Concluded from Page 1, Column 5)

by the more simple expedient of grabbing an unexpected opportunity, the net result is a situation that is almost the exact opposite of what was generally expected a few short months ago.

The actual appearance of Majestic undoubtedly will have a beneficial effect upon the industry. The rumor period is at an end; everybody knows just where he stands, and can get right down to hard work. The great reservoir of buying power which has been held intact by the expectation of a cheap refrigerator should now be released, and the industry's sales curve should jump upward. Also the arrival of Majestic as an active competitor should stimulate sales organizations throughout the industry, and keep the public better informed than ever before of the benefits of up-to-date mechanical refrigeration.

WATCHING FOR MAJESTIC IN THE DETROIT SECTOR

Detroit, Mich.—This city, the home of a group of refrigeration manufacturers, and always a liberal buyer of refrigerators, has watched the slow advance of the Majestic unit with intense interest. Probably there is no other city which has followed the Grigsby-Grunow plans and announcements more carefully than has Detroit.

The Majestic, or rather the shell of the Majestic, made its first appearance here at the manufacturers' radio show in the Detroit-Leland, June 17th-19th. It was in good company, for several other refrigerator manufacturers, including Westinghouse, Copeland and Norge, were represented at the show, and were busy signing up radio dealers from all over the state.

In the rooms assigned to Grigsby-Grunow two Majestic cabinets were on view, a 5-foot and a 7-foot model. A card on the top of each cabinet explained that it had been impossible to get the refrigerating units to Detroit in time for the show. This greatly disappointed the Detroit refrigeration sleuths, who advanced en masse on the hotel to discover Majestic's innermost secrets.

Concealing their disappointment and posing as prosperous radio dealers from somewhere in the Upper Peninsula, they went over the cabinets like doctors examining their patients, and then gathered in the corridors to discuss what they had found. The big hump in the back of the cabinet was the subject of much lively debate, but with no unit in evidence, accurate diagnosis was not an easy job. Nevertheless some of the boys, working on the principles employed by those scientists who reconstruct a complete dinosaur from a couple of teeth, did pretty well with the Majestic.

It was generally understood at the time that the cabinets which were shown here had not been made in the new Majestic factory, but had been built to Majestic specifications by a well-known cabinet manufacturer.

The "dealers from the Upper Peninsula" finally got what they wanted about September 8th, when the Detroit Electric Company, Majestic distributor for this part of the world, installed a 7-foot model, unit and all, in the center of the big showroom on East Jefferson. It was actually plugged in with a long extension cord, and the hawkshaws discovered that it would refrigerate and make ice cubes. They delightfully probed its innards, glibly and hypocritically talking dealerships the while, and before they left, knew about all there was to know about the new machine.

Last week, Majestic also went on view at a special radio show conducted by the Wextark organization, which sells several makes of radio and up to now has handled Copeland refrigerators. Advertisements in the Detroit newspapers called attention to the fact that the new Majestic refrigerator could be seen, and it proved one of the real attractions of the show.

The Detroit Electric Company is expecting big shipments from Chicago at any time, and is organizing its forces to put Majestic across in a big way in a territory where refrigerators have long been known and appreciated.

FIRST MAJESTIC CARLOAD GETS SPLENDID SENDOFF

(Concluded from Page 1, Column 3)

a flooded system with a high-side float, and a special control made by Majestic. An indicator light on the cold control (which is on the cabinet front) burns if the line voltage is incorrect, preventing the blowing of fuses.

Eventually the entire refrigerator will be made in the Majestic factories. At present, however, ice trays are being furnished by Fedders, and bellows by Clifford. Bush, Fedders & McCord all have supplied condensers.

Majestic distributors are meeting Wednesday, October 8th, at the Lakeshore Athletic Club, Chicago, to take up final plans for marketing the new refrigerator.

A brand new factory of huge proportions has been built adjoining the Grigsby-Grunow radio cabinet factory, to manufacture the Majestic cabinets. Assembly work is also done there. The line production job begins in this factory with four huge punch presses, which stamp out three sides of the cabinet at one blow. These machines were built according to specifications by a Toledo concern.

Going through various heat treatments, spot weldings and lacquerings, the cabinets ultimately acquire legs and a back. Three coats of white lacquer are applied by successive workmen with spray guns while the cabinets continue on their shuttle journey up and down the factory. During the process they are heated at a temperature of 360 degrees F. for a period of 24 hours.

Over this line a high bridge has been built. There, on the opening day of line production, the chief engineer paced up and down watching the endless journeying. Proud as a newly-made father he was, and nobody would question his right to that pride.

The final step is the insertion of the unit in the top and the placing of the lid. This done, and all the inspections safely passed, the machines are boxed and travel up an incline and outside to a loading platform, where freight cars are waiting.

A great many women are employed in this plant, working in overalls. Many of the jobs are done on a piece-work basis.

SPECULATIVE BUILDER FINDS COPELANDS HELP SELL HOUSES

Chicago, Ill.—Edmund F. Lindop & Company, of Oak Park, built 89 bungalows in Maywood, Illinois, during 1929 and 1930, and equipped every one with a model A-5 Copeland refrigerator. Specializing in "better-built homes," this firm found that Copelands helped to make sales. As a result they made a point of publicizing the slogan, "Copeland Dependable Electric Refrigeration is Standard Equipment in Lindop's Homes."

John Cummings Lindop, brother of E. F. Lindop, is also an extensive user of Copeland refrigeration equipment. As the head of one of the largest real estate management concerns in Chicago, he installs a large number of Copeland refrigerators in his buildings.

NEW QUARTERS FOR N. Y. KELVINATOR DIVISION

New York, N. Y.—The utility division of the Kelvinator Corporation has changed its New York headquarters from No. 1 West 47th Street, the branch office address, to Suite 2645, Equitable Trust Building, No. 120 Broadway, Phone Rector 1686, according to an announcement from Campbell Wood, manager of the division.

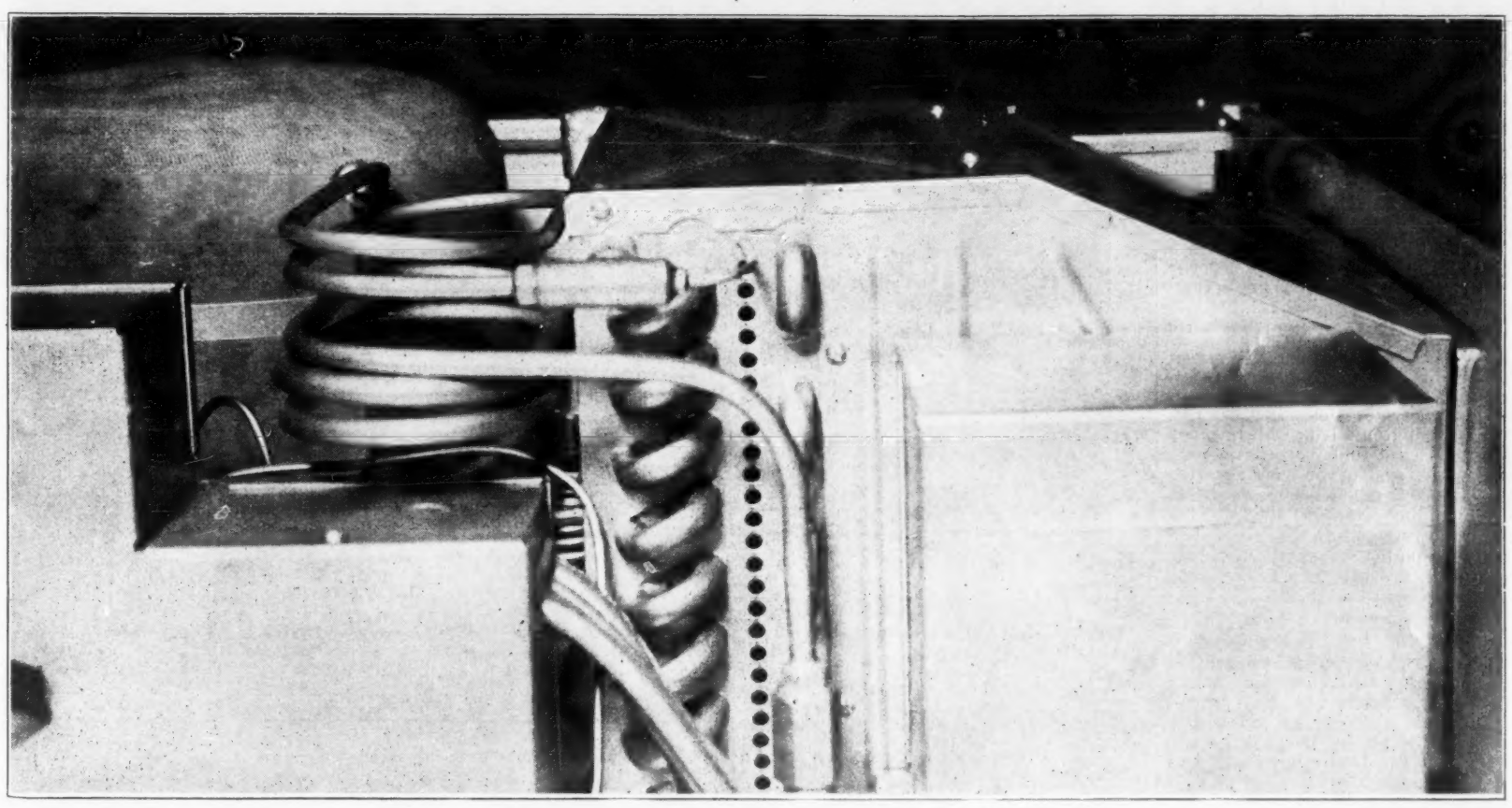
This separate New York Utility office has been established with a view to giving better service.

BRANCH MANAGERS ARE OPTIMISTIC

Detroit, Mich.—Branch Managers of the Copeland Sales Company from New York, Chicago, and Detroit gathered here last month to confer on merchandising plans for the remainder of the year. The meetings were held at Hotel Tuller on September 13th and 14th.

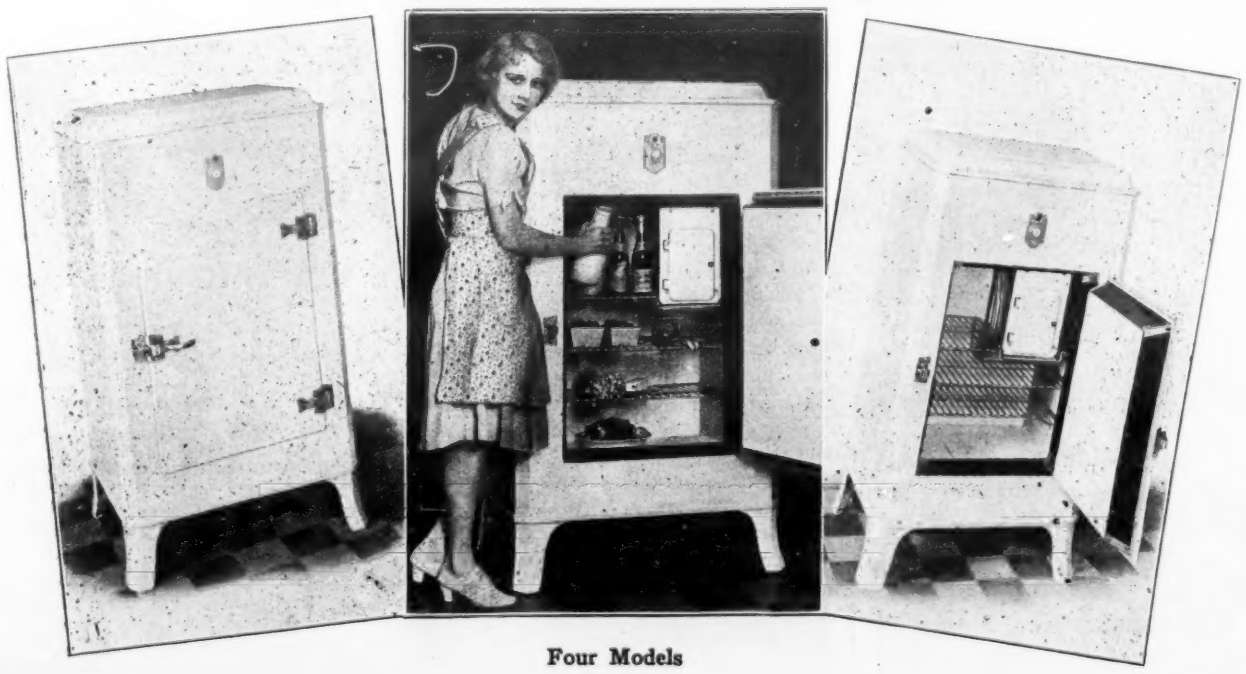
At the conference favorable reports were submitted on this year's business by the respective managers of those territories. These were taken as an indication that business in the metropolitan centers is definitely on the up-grade.

A Peep Into Majestic's Anatomy



ENGINEERS have been speculating as to the type of equipment that would be used in the Majestic. Here is a closeup of the much guessed about condensing unit. At the far left corner, the compressor with its round dome can be seen. Directly in the middle is the condenser with an enclosed fan for circulating the air drawn in through the vent at the rear of the cabinet.

The Graceful Majestic Cabinet



Four Models

SEEPAGE PROOF FITTINGS

ALL combinations of pipe and tube ends in the most complete line of fittings on the market for Automatic Refrigeration.

Send for Catalog No. 36

COMMONWEALTH BRASS CORPORATION

Commonwealth at G. T. R. R.

DETROIT

"*It was built by* BOHN"

The handy base cabinet may either be used for refrigerating machinery or the storage of cooking utensils, canned goods, vegetables, etc.

The name BOHN is our warranty that the finest materials obtainable have been utilized by skilled craftsman and refrigeration engineers to build for you this beautiful and scientific product—an all-porcelain BOHN refrigerator.

BOHN installations include many of the leading hotels, restaurants and hospitals in America.

BOHN refrigerators are used exclusively on all Pullman-built railway dining and buffet cars.

The United States War Department has purchased hundreds of all-porcelain BOHN refrigerators for our army barracks and battleships.

In choosing BOHN refrigerators, discriminating home owners throughout the country have given BOHN a representative list of which any manufacturer might be proud.

Write for details of the remarkably low prices that are now prevailing.

BOHN REFRIGERATOR COMPANY
SAINT PAUL, MINNESOTA

LITERATURE OF MANUFACTURERS

Catalogues, bulletins and other material recently issued.

Manufacturers are requested to send copies of new trade literature to Electric Refrigeration News.

Bristol

Catalog No. 1104 has been sent to the trade by the Bristol Company, Waterbury, Conn. It is devoted to a description of Bristol's Class I recording thermometers, of which a number of styles are illustrated. Three of the models are of the portable type.

DoleCo

The Dole Refrigerating Machine Co., 1209 W. Washington Blvd., Chicago, has recently released a folder on the DoleCo sub-zero plate system of refrigeration for quick-frozen foods. The complete system, including storage and display cases, storage refrigerators, all equipped with sub-zero plates and refrigerated by a DoleCo unit, are illustrated.

Yukon

Benedict & Co., Ltd., Los Angeles, a recent entry in the electric refrigeration field, is showing its complete line of domestic electric refrigeration in a broadside. Cabinets by Seeger are offered in the AP and LP series, the former all-porcelain, and the latter porcelain and enamel. "Yukon" also has a line of commercial equipment.

REQUESTS FOR INFORMATION

Readers who can be of assistance in furnishing correct answers to inquiries, or who can supply additional information, are invited to address Electric Refrigeration News, mentioning query number.

Silica Gel

Query No. 377—"I would like to know very much where I could obtain some silical gel and what would it cost."

Note—Davison Chemical Co., Baltimore, Md.

Condensing Units

Query No. 378—"I am wondering if you can put us in touch with some reliable factory making a complete condensing unit using sulphur dioxide in sizes up to one-half ton ice melting capacity."

Export Franchise

Query No. 379—"We are interested in securing a line of refrigeration equipment for both domestic and commercial use, for sale outside of the United States.

"We are a well established firm and have contacts in many parts of the world, the writer having just returned from a three-years' trip abroad.

"If there is any way in which you can put us in touch with the manufacturers of such equipment who have not already made arrangements for the sale of their product abroad, we will be much obliged."

Fulton Sylphon

Query No. 380—"We understand that there is a concern at Knoxville, Tennessee, manufacturing a thermostat expanding and contracting bellows arrangement. We would like to have the name and address of this company."

Note—Fulton Sylphon Company, Knoxville, Tenn.

Frostair

Query No. 381—"We would appreciate any information which you can give us on the Frostair electric refrigerator as manufactured by the Sturtevant Company and sold by J. Rose & Company of New York."

Ice Cube Trays

Query No. 382—"We are in the market for one gross of 12-section ice cube trays. We are not particular as to the size or make of these trays. Can you advise us as to whom we should get in touch with."

Note—Fedders Mfg. Co., 57 Tonawanda St., Buffalo, N. Y., and Kulair Corp., 1609 Finance Bldg., Philadelphia, Pa.

Display Cases

Query No. 383—"Kindly send us a list of first class refrigerator showcase manufacturers."

Note—The Annual Catalog and Directory issue of the NEWS, Jan. 1, 1930, contains a listing of manufacturers of refrigerator display cases.

Refrigerants

Query No. 384—"Please tell me where I can get a 5-lb. drum of ethyl chloride. I have tried several places in Kansas City but can find no one there that handles it. Would appreciate it very much if you can give me this information."

Note—Dow Chemical Co., Midland, Mich., and Roessler & Hasslacher Chemical Co., 10 East 40th St., New York, N. Y.

Query No. 385—"Will you please send us a list of manufacturers of the following products: sulphur dioxide, methyl chloride and ethyl chloride."

Note—Sulphur dioxide—Ansul Chemical Co., Marinette, Wis.; Calco Chemical Co., Bound Brook, N. J., and Virginia Smelting Co., West Norfolk, Va.; methyl chloride—Roessler & Hasslacher Chemical Co., 10 East 40th St., New York, N. Y.; ethyl chloride—(See Query No. 384.)

Small Service Drums

Query No. 386—"I am in need of small size drums for carrying refrigerating gases used in service work. I have been following advertisements in the NEWS for the past several issues, but have not seen any covering service drums."

Note.—Prestolite Corporation, Indianapolis, Ind.

Steel Stampings

Query No. 387—"We are desirous of obtaining information as to where we can obtain steel stampings of domestic refrigeration cabinets. We understand that there are companies making these stampings for final assembly elsewhere."

Rambling Advertising

Popularizing refrigeration in northern Illinois towns

Chicago, Ill.—An attractively-designed float is being used by the Public Service Company of Northern Illinois to advertise electric refrigeration. This float compels attention in the day time, and at night it is illuminated with several different colors, which cause it to stand out prominently. The Public Service Company is using this float in its towns, having it driven up and down every street in the town for a period of several days.

SEPTEMBER SALES SHOW NO DECLINE

Portland, Me.—Electric refrigeration sales for September showed more than a 100 per cent increase over the same month last year, while figures for the first seven months of the year indicate that total sales were running about 12 per cent ahead of 1929, according to William B. Ward, manager of the Frigidaire Sales and Service Company of this city, distributors for Cumberland County.

Included among the large installations made by this firm during September are: domestic units in two model home developments in the suburbs of Portland: $1,500 McCray box and D compressor at Thompson's Sporting Camps, South Casco; a 10-unit multiple installation in the Sparrow Apartments, and several domestic units in the Broadview Apartments, South Portland's first apartment house. Installation of a chocolate cooler was also completed in the Peggy Ann Candy Store, Portland, recently.

CALIFORNIA YUKON MODEL NOW ON MARKET

Los Angeles, Calif.—Manufacture of electric refrigerators under the trade name "Yukon" is now under way at the plant of Benedict & Company, Ltd., 2867 Pico Street, Los Angeles. B. B. Benedict is president of the new organization, which, at the present time, is using 6,000 square feet of floor space for the manufacture of refrigeration products.

Domestic cabinets in the "Yukon" line are available in capacities ranging from 4½ to 32 feet. Cabinets are by Seeger and the DeLuxe models have the water-cooling tank, Chilltray and vegetable bin as standard equipment. To round out its line, Benedict & Co. has compressors and cabinets for commercial installations.

MAJESTIC REFRIGERATOR DISPLAYED IN DENVER

Denver, Aug. 5.—The Intermountain Majestic Co., headed by Tom Savage, is preparing to distribute the new Majestic refrigerator in Colorado, New Mexico, Western Texas and Eastern Wyoming. Dealers in the field are being organized to handle the machine.

NEW WAYNE DEALER

Meriden, Conn. — Modern Utilities, Wayne refrigerator dealership, has opened showrooms at 62 Grove Street. Ralph E. Fairchild is head of the concern.

The Expansion Valve

By GEORGE F. TAUBENECK

"Once upon a time there was a human dynamo named Bill Grunow." That, friend reader (if any), is the way this little tale should begin.

Not that it's a fairy story, although Adam, the baby, and the Man from Mars might be perfectly justified in so identifying it. But so many good stories have been built up around this man Grunow that he has become almost a legendary hero in the Majestic organization.

Who is Grunow? He's the rampant half of the Grigsby-Grunow Co., which makes the Majestic radio, produced in greater quantities than any other receiving set on the market.

The Majestic refrigerator, about which there is considerable furore in this issue, is also a Grigsby-Grunow product. And there will be others—vacuum cleaners, washing machines, fans, and so on far into the night.

Grunow is president of the company. Grigsby is chairman of the board. The former, who has charge of sales and production, is the spectacular member of the firm—a Rooseveltian type, a born fighter still under 40, the sort of man around whom a mythology springs up as naturally as dandelions in warm weather.

Grigsby, who takes care of the development of company policy, public and trade relations, is also the financial genius of the firm. He is the thinker, whereas Grunow is the man of action. (That Grigsby can fight, too, is attested by the fact that he has set out to lick General Electric, Westinghouse, RCA, and the A. T. and T. on the question of licensing tube patents.)

Ten years ago this partnership existed only in imagination. After Grunow returned from the war (where he made a meteoric rise from the ranks), he called on Grigsby, who immediately liked him and hired him as a bookkeeper.

At that time the senior member of the present Grigsby-Grunow Co. was with the Benjamin Electrical Mfg. Co. of Chicago. Not long before this momentous meeting he had built a factory in London for that company.

The two men soon were lunching together daily, and out of these noonday confabs there arose the germ of their idea to go into business together and build automobile accessories.

In 1921 they started, with a capital stock of $37,500. A man by the name of Hinds entered the firm, which was then Grigsby, Grunow, and Hinds. Beginning with an automobile trouble lamp, they progressed through the manufacture of several specialties, finally striking a rich but shallow vein of profits with a windshield visor.

They had a rushing business with this visor, so the story goes, when sedans (visor-equipped) came into their own. Before they had time to get on their hunting togs to look for a new product, it walked into their office.

Their Pacific Coast distributor, Bill Seroy (the Zerite man), had run across a young fellow with a battery eliminator for radios, and sent him post haste to the home office.

A big success was the battery eliminator, and money began to roll in. But Grigsby and Grunow weren't satisfied. They decided to make complete receiving sets.

Hinds looked upon the idea much as the villagers of yore looked upon Darius Green and his flying machine. He took his playthings and went home. And that was the inception of the Grigsby-Grunow Company.

In March, 1929, the new firm began manufacturing complete radio sets. Within three years they pocketed more than twenty million dollars apiece. Hinds, who had retired to safety with a paltry few score thousands, was seen mourning on street corners.

Another play-safe boy who had plenty of opportunity for weeping and wailing and gnashing of teeth was the contractor who put up a $300,000 factory for the Grigsby-Grunow Co.

He was offered a parcel of stock in the company in part payment, but insisted on receiving cash for the entire transaction. Had he accepted the stock, in one year's time it would have been worth 19 million dollars. Believe it or not.

So many choice tales can be picked up around the Majestic factories about these two industrial comets that one who has heard them longs for a log fire, a pipe, and a professional listener.

Grunow would have made a first class football coach. He is a driver, a man who reacts to the "it can't be done" attitude like a bull terrier to a Persian feline.

At the new Majestic refrigerator cabinet and assembly plant, through which the Expansion Valve recently went in the pleasant company of "Tommy" Thompson, the same line production methods that made Grunow the "Henry Ford of the radio industry," are in evidence.

As one might suspect, the refrigerator which Majestic engineers devised, and Bill Grunow tested last winter in baked Arizona, reminds one of a radio. The cabinet is reminiscent of phonograph models, while the unit—built on a block, with parts enclosed, and all fashioned in shiny metal—is like nothing so much as a radio chassis.

Early refrigeration compressors, built by automobile men, resembled a gasoline engine. Electrical engineers wound their units around an electric motor. Now comes the radio machine. If Montgomery Ward begins manufacturing a unit, as has been reported, it probably will look like a catalog.

THE CONDENSER

ADVERTISING RATE fifty cents per line (this column only).

SPECIAL RATE if paid in advance — Positions Wanted — fifty words or less, one insertion $2.00, additional words four cents each. Three insertions $5.00, additional words ten cents each. All other classifications—fifty words or less, one insertion $3.00, additional words six cents each. Three insertions $8.00, additional words sixteen cents each.

POSITIONS WANTED

REFRIGERATION Engineer—Have had 5 years' experience in electric refrigeration with leading manufacturers; in charge of engineering development, and also as superintendent of plant. Previous to this had 10 years' experience in mechanical engineering. Desires connection with reliable company. References and full particulars furnished. Box No. 282.

WANTED position as assistant product manager or contact man with a General Electric Distributor, by man who has had factory training in the product division; has complete knowledge of the unit. No objection to assisting in sales or service. Will go anywhere at any time. Box 283.

SALES executive, seasoned, experienced commercial sales producer available. Age thirty-eight, will travel. Well qualified to obtain, train excellent sales outlets and salesmen and keep them enthusiastic and productive. Record of ability, character, industry and capacity will bear close scrutiny. Unquestionable references. Principals write in confidence to Box 284.

EXPERIENCED service man available. Thoroughly familiar through long experience with Frigidaire and Kelvinator installation and service. Formerly employed by Kelvinator-Nizer and several ice cream manufacturers. Best of references as to ability and character. Wish to obtain service or general repair work. Address Box 285.

Wanted
EDUCATIONAL SUPERVISORS

In 1931 Westinghouse will greatly expand the territory in which they will sell Westinghouse refrigerators, and will need at once two Sales Education Supervisors to work at the factory and in the field.

These men must have at least three years of refrigeration experience, men who can speak well and write well will be given preference. We would be interested in hearing from men who can meet these qualifications. All applications will be held in strict confidence. Details of experience, salary expected, and, where possible, a photograph, should be sent to Mr. Ralph Gates, Manager, Refrigeration Sales Promotion, Westinghouse Electric & Mfg. Company, Mansfield, O.

Be An EXPERT in ELECTRIC REFRIGERATION
Learn at home new easy way. Oldest, largest home study electric refrigeration school offers thorough, practical training, endorsed by Servel, Kelvinator, Copeland, Zerozone, and other leading manufacturers. Wonderful pay-raising opportunity for service men; practical help to dealers, salesmen, manufacturers. Special proposition to firms who wish to train staffs. FREE BOOK explains everything. No obligation. Utilities Engineering Institute, Dept. 4100, 4403 Sheridan Road, Chicago, Ill.

DRINKING WATER FAUCETS
for
Refrigerators — Water Coolers
New model now available for use on city water pressure

CORDLEY & HAYES
147 Hudson Street New York City

Precision Built
VALVE Needles
VALVE Seats
VALVE Mechanisms
Four years of satisfactory service to the industry
Buerk Tool Works
42 Pearl St. Buffalo, N. Y.

European firm with best connections in the refrigerating field, which heretofore has been handling the products of a world-known manufacturer,
SEEKS NEW CONNECTIONS
with manufacturers of small refrigerating units who are in the position to guarantee, not only to promise, the quality of their products. Please send literature and price list f.o.b. New York, for domestic as well as commercial line to L. V. 6141 RUDOLF MOSSE, LEIPZIG, GERMANY.

Refrigerated Food Section

In Three Parts—Part 2

ELECTRIC REFRIGERATION NEWS

Registered U. S. Patent Office.

The business newspaper of the refrigeration industry

ISSUED EVERY TWO WEEKS
VOL. 5, NO. 3, SERIAL NO. 105

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DETROIT, MICHIGAN, OCTOBER 8, 1930

Entered as second class matter Aug. 1, 1927, at Detroit, Mich.

FIFTEEN CENTS PER COPY
TWO DOLLARS PER YEAR

MODEL

Dairy Farm In Virginia Makes Good Use of Electric Refrigeration

Fredericksburg, Va.—In a setting where farming was practiced long before the American Revolution, the latest in electric refrigeration equipment rubs elbows with history.

Sherwood Forest Farm, near here, owned by John L. Pratt, vice-president of General Motors, contains a Frigidaire tank-type milk-cooling installation. This equipment, now completing its first summer of operation, cools milk produced by a thoroughbred herd of Guernsey cattle.

Milk from Sherwood Forest Farm is sent to Richmond, 60 miles away. Graded as Double A Guernsey, this milk is certified instead of being pasteurized and is sold to consumers at an average of three cents a quart higher than regular milk. Leaving the electrically-refrigerated milk cooler for its truck ride at Richmond at about 40 degrees, the milk arrives there at 50 degrees.

Sherwood Forest Farm is completely electrified. A Frigidaire household model is installed in the kitchen of the home. Cooking is done by electricity. At the barns, milk is cooled, cows are sprayed and clipped, lighting is furnished, all by electricity. Mr. Pratt is making Sherwood Forest Farm and the Sherwood Forest cattle represent the last word in modern dairying.

The three photographs on this page were all taken at Sherwood Forest Farm. They show far better than the printed word the up-to-date atmosphere of the entire establishment, and the almost ideal conditions that surround the production of milk. The photograph in the lower left-hand corner gives a good idea of the appearance of the Frigidaire milk-cooling equipment which plays so vital a part in keeping the milk in good condition while awaiting shipment to Richmond. The other picture, taken at milking time, shows a number of the registered Guernseys for which Sherwood Forest Farm is famous.

Mr. Pratt comes from the section in which his model dairy farm is located and his associates in the General Motors are inclined to accuse him of taking more interest in his business of dairyman than he does in the production of motor cars.

This farm is situated only a few miles from the spot where Washington spent much of his boyhood. During

SPRINGFIELD

Springfield, Mass.—Quick-frozen foods are becoming a staple item here as the General Foods Corporation continues its sales in a group of stores. The volume of business still continues satisfactory to both producer and retailer.

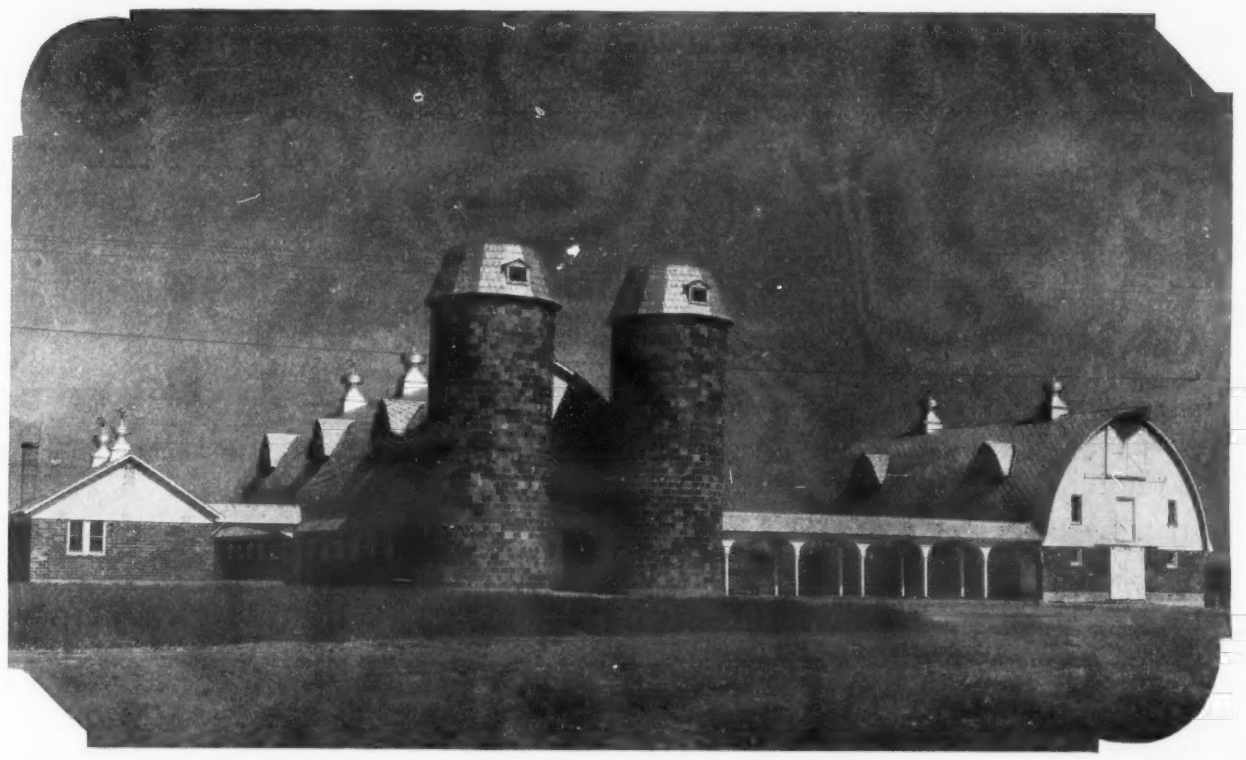
A new departure in Birdseye frosted meat packages enables the consumer to buy smaller portions for individual or small-family needs. By this provision it is possible to obtain a steak weighing half a pound or a pound and a half, a rib roast weighing as little as three and a half pounds, and two or six chops, as desired. This addition was made in conformance to demands from many customers.

DAIRY INDUSTRIES EXPOSITION, OCT. 20-25

DAIRYMEN will gather in Cleveland this month for the annual Dairy Industries Exposition, which will return to the great Public Auditorium after a trip to Canada in 1929. Manufacturers who make equipment for the vast dairy industry with its wealth of products will show their latest models and will contribute their share to the advancement of an industry to which the country daily entrusts its health.

This issue of the Refrigerated Food section contains much material of interest to men engaged in dairy work.

Completely Electrified



Silos and cow barns at Sherwood Forest Farm

CONSENT DECREE

Struggle Under Way in Capital

Washington, D. C.—Hearings on the application of Swift and Armour to modify the Packers' Consent Decree were scheduled to begin in the Supreme Court of the District of Columbia on October 7. The decree as it now stands prohibits the packers from retailing meats and related commodities. Armour and Swift are seeking to have the court modify the decree, so that they can enter the retail field. Many believe that with quick-freezing of meats winning popularity in many parts of the country, the packers are bending their efforts to win their point, in order to be in a position to take full advantage of the anticipated popularity of the new products.

FROM GLUECK TO BELSEY

Los Angeles, Calif.—Miss Alice Robertson, formerly with Glueck & Company, General Electric refrigerator distributor at Kansas City, has accepted the appointment as home service director for the George Belsey Company, Los Angeles distributor for General Electric refrigerators.

PACKERS TO MEET

THE Institute of American Meat Packers, that extremely efficient organization which concerns itself with the welfare of the packing industry, will hold its annual convention at the Drake Hotel, Chicago, October 17-22nd. A number of important questions will be discussed at the sectional meetings.

NEW CASE

For Frozen Products Nearly Ready

New Haven, Conn.—Walman Store Fixtures Company, 300 East Street, has installed food display cases in two Connecticut markets. Two 12-foot meat cases and one 12-foot fish case have been placed in Taylor's Market, 128 Church Street, Naugatuck. The unit is Frigidaire.

A 36-foot, metal-bottomed display case and refrigerated window case have been installed in the market of B. Lebovitz, 281 Main Street, Danbury. Refrigerating equipment was supplied by the Baker Ice Machine Company of South Norwalk.

The Walman Company is preparing to introduce a new type of display case for quick-frozen meats, anticipating a demand for equipment of this type. Storage space will be provided in the base of each cabinet, and triple glass will be used, according to Walter Walman, president. The demand for cases of the ordinary type is still running strong, he says, and the factory is extremely busy at the present time. The concern contemplates extending its field outside of Connecticut in the near future.

REINDEER MEAT

Advocated as Food of Future

San Francisco, Calif.—M. D. Snodgrass, manager of the Federal railroad that runs through the Tanana Valley, Alaska, from Anchorage at tidewater north to Fairbanks, stopped in San Francisco on his 15 months' tour of the western and middle west states to pick out enterprising farmers with families to move up to Alaska and settle on 160-acre farms. Due to the quick-freezing and the improved storage methods made possible largely through electric refrigeration, says Snodgrass, the Alaska reindeer is the forthcoming great meat supply for the United States. Some 18,000 of the carcasses of these animals are now shipped to the mainland yearly, and the territory has plenty of feed for 8,000,000 of them, easily sufficient to supply 1,000 carcasses per day to the world. At present there are about 100,000, with a wonderful increase each year. The railroad is planning the building of a great system of abattoirs for the increasing slaughter.

The interest of the United States Government in the disposition of the Alaska reindeer meat was in evidence several months ago, when a representative was sent to Springfield, Mass., to study the possibilities of quick-freezing.

BANNER

Week of Muncie Experimental Campaign Keeps Sales Curve Climbing

Muncie, Ind.—The best week's sales since Sally Lee Frigid Meats were introduced here more than two months ago was recorded last week by the Indianapolis Abattoir, Inc., producers of the quick-frozen products. The sales curve goes steadily upward and public acceptance of the new packaged and frozen meats seems assured so far as Muncie is concerned.

A new Piggly Wiggly store was opened here a few days ago and made its start in life with a stock of Frigid Meats as part of its offering to its customers. A larger storage case than those used in the other stores here was installed, and instead of being refrigerated by Dry Ice, was equipped with a Frigidaire unit. Some observers believe that this is an indication that the Indianapolis Abattoir officials have abandoned their experimenting with Dry Ice cabinets, and will rely on mechanical refrigeration in the future. The new case in the Piggly Wiggly store has several compartments for the different items and is arranged to facilitate self-service.

The introduction of a second-grade of packaged Frigid Meats has been delayed, and only the first grade cuts are being sold thus far.

Part of the campaign strategy recently adopted is the selling of week-end specials, attractive prices being advertised for sirloin steaks and pork chops. The records kept at the stores show that the introduction of these specials has brought in a large number of new customers who have tried the quick-frozen meats for the first time.

MEXICANS

Plan Big Cold Storage Plant

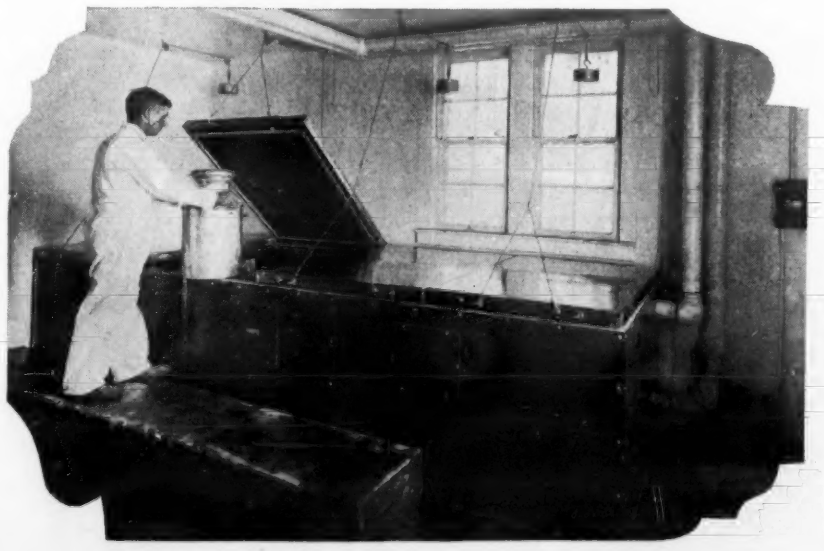
Mexico City, Mex.—Agriculturalists of the state of Guanajuato are making arrangements for the establishment of a large refrigeration plant in the city of Leon. The plant will be used for the storage of potatoes, fruits and other farm products during times of low market prices. Quantities of these products could be taken from the refrigeration warehouse and sold when prices are better, according to this plan.

The movement was initiated by potatoe planters in the Leon region, where great quantities of this vegetable are produced. Funds for the purchase of refrigeration machinery and the erection of the cold storage warehouse are being raised among the various agriculturalists interested in the project.

SYRACUSE

Syracuse, N. Y.—Frozen fish steaks, put up in small packages, two steaks to a package, are winning their way to popularity here. The sales campaign of the Atlantic Coast Fisheries has been under way only a short time, but the number of stores handling the new product is continually growing.

Frigidaire Coolers



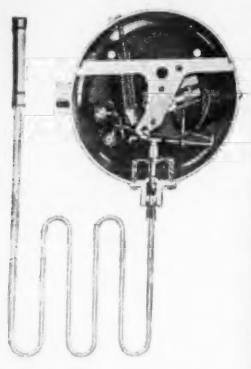
SWIFT TRIES TASTE OF ARMOUR MEATS

Chicago, Ill.—Packaged quick-frozen meats bearing the Armour trademark were tested in the experimental test kitchens of Swift & Co. during the latter Swift & Co. factory restaurant. These employes. The Armour frozen meats, however, are not yet ready for the market.

Quick-frozen peas, kept in ice cream container packages, are on sale at the legumes are frozen and packaged by Libby, McNeil & Libby, a subsidiary of Swift & Co.

Registered Guernseys

a special MERCOID
for commercial refrigeration



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LOW IN PRICE · ACCURATE DEPENDABLE

HERE is a new Mercoid especially designed for control of temperature on frozen food cases, milk coolers, soda fountains, ice cream cabinets and general use for all refrigerated dairy products. It is absolutely dependable, requires no service and yet is low in price. Easily adjusted for any cut-in or cut-out point.

There is a Mercoid for every refrigeration need—to control by pressure or by temperature. And there are Mercoids that combine automatic control with high pressure cut-out in one instrument.

Mercoid controls, for regulating temperature, pressure or vacuum operate with the well-known Mercoid switch—no exposed arc—no corrosion of contacts—and the control carries full line current, either 110 or 220 volts.

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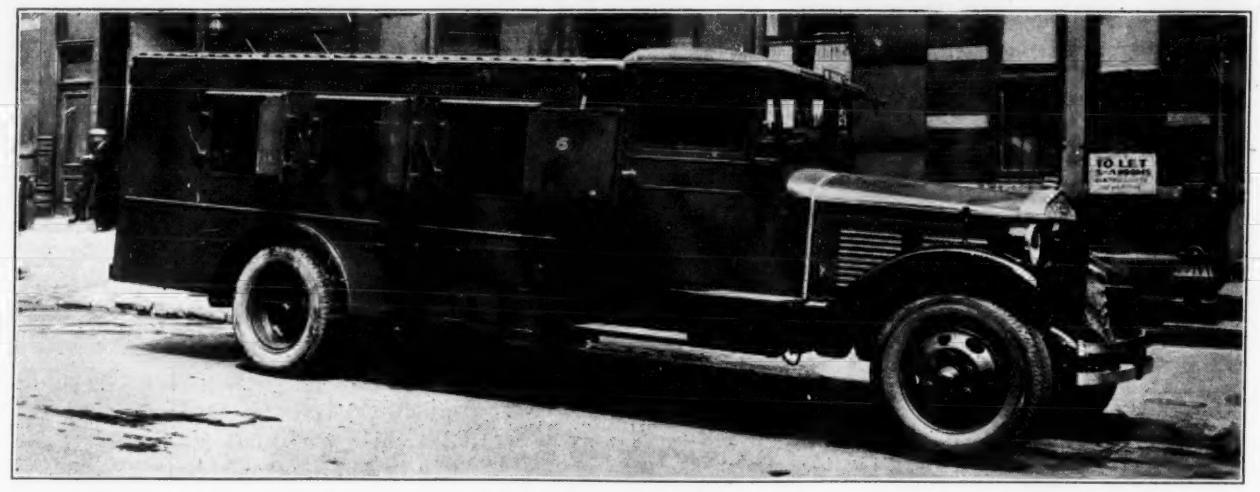
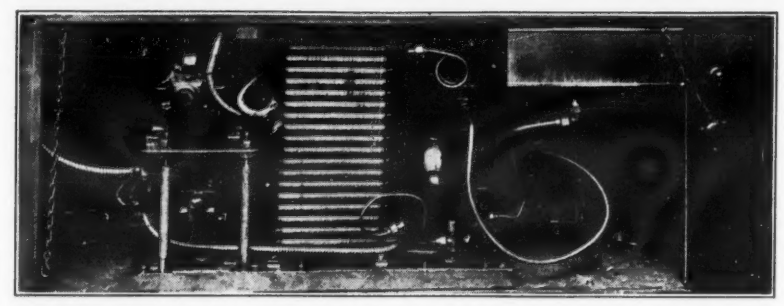
Servel Units for Delivery Trucks



Evansville, Ind.—Already known as a pioneer in dairy refrigeration, Servel is now preparing to release special equipment for use on delivery trucks. Laboratory experiments started several years ago were brought to a stage warranting field tests this year, and the results have been highly satisfactory. The work has been carried out in coöperation with prominent ice cream manufacturers, and by close attention to detail various difficulties have been overcome one by one.

Naturally the most fertile field at present for this work is the ice cream delivery truck. The old salt and ice method has always been wasteful and the cruising radius of a given truck limited. With the improved Servel equipment trucks can carry a larger pay load, travel farther, at less cost, and deliver hard cream at the far end of the route. Gradually, of course, the same benefits will become apparent to other food distributors and refrigerated trucks for meats and vegetables, both frosted and fresh, will be available.

Visitors at the Cleveland Dairy Show will have a chance to inspect the several exhibits in which the latest designs of insulated truck bodies are refrigerated by built-in Servel machines. Servel's engineers are ready to assist body manufacturers in laying out their designs so that this type of equipment can be installed, either at the body factory or in the user's plant.



DRY ICE AND ITS APPLICATIONS

Cincinnati, Ohio—The possibilities of "Dry Ice" in the refrigeration picture were discussed at length by D. H. Killeffer, of the Dry Ice Corporation of America, before the division of industrial and engineering chemistry of the American Chemical Society at its meeting here on October 1. Mr. Killeffer said, in part:

"The first pound of solid carbon dioxide for commercial refrigerating purposes was sold by the DryIce Corporation of America in 1925. In 1929, production approached 15,000 tons, and the expected sales of "DRY-ICE" for the calendar year 1930, based upon figures for half of that period, will probably exceed double that figure, greater than the annual production of liquid CO_2 in the United States. This quantity of material is being produced in eighteen plants from coast to coast in the United States, and distribution is being effected through twenty-seven sales outlets supplied from plants more or less remote by automobile truck and by a private railroad car line of forty cars devoted solely to this service.

"Gaseous carbon dioxide as generated from the evaporation of "Dry-Ice" is, of course, cold, and by virtue of the low temperature of its origin, extremely dry. It possesses a relatively low specific heat and an extraordinarily low heat conductivity. For the preservation of perishables by cold these conditions are quite ideal. First of all, they make possible the use of insulated containers of much more efficient structure and materials than can be used where quantities of water or brine must be seriously considered. Not only can such materials as cellular paper and fiber be built into refrigerated containers for a single service, with no fear of destroying them or their value by water, but actually the treatment of insulation by the dry gas continuously removes moisture from it, moisture, of course, being the most prolific cause of insulation breakdown. The transfer of heat within the refrigerator is easily effected by means of the gas itself whose low heat capacity assists materially in preventing overcooling. The replacement of air in the cells of insulation by the much better insulator, carbon dioxide, materially reduces heat leakage, and the resistance to heat flow of the atmosphere of carbon dioxide within the refrigerator still further reduces the heat in-flow and hence the refrigeration load.

"No serious technical problem remains in the production of any temperature desired from that of the atmosphere down well below the range of any reasonable commercial requirements. A 'Dry-Ice' refrigerator for maintaining a temperature of, say, 40 degrees F., for a period of ten days or so without in the meantime recharging with refrigerant has been developed, and numbers of these are in commercial use now where circumstances have justified their installation.

"The principles adopted in making 'Dry-Ice' refrigeration economical are based on the above. Design of refrigerators is such that the temperature of the commodity is maintained with as little departure as possible from that at which it is received. In other words, the system is so constructed as to prevent the entrance of heat to the lading. This is accomplished by more or less isolating the solid itself and allowing the circulation of carbon dioxide gas, whose low heat capacity prevents supercooling, and whose high insulating value prevents the entrance of external heat. Appropriate arrangements are made for allowing the gas to permeate the lading or not, as conditions require.

"In handling perishables which are not damaged by too low temperature, such as ice cream, the perishable itself can frequently be used as insulation for the refrigerant. In this practice the outer insulated case is filled with the perishable and the refrigerant insulated if necessary from the perishable to control its heat absorption rate, is placed in the center of the package. Here the continually generated gas moves outward through the lading, carrying heat with it."

Hercules to Make New Ice Cream Body

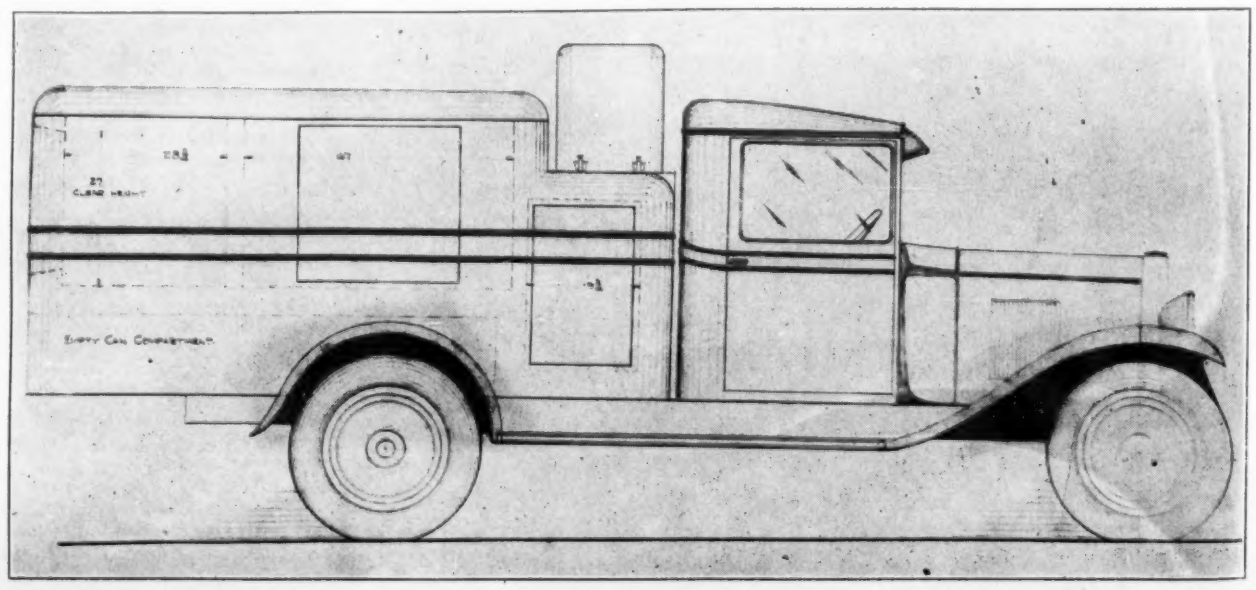
Evansville, Ind.—A contribution to the ice cream industry is made by Hercules Products Inc., through the announcement of a new ice cream body for the lighter class of 1½ ton chassis. A body design has been perfected that should prove an efficient, low-operation cost unit for route ice cream delivery. It represents some features of construction and arrangement that are new.

There are three compartments, all fully insulated and refrigerated. The front compartment is intended for handling brick and other ice creams that require the lowest temperatures. The front and center compartments are entered through doors in right side, while the rear compartment is entered through a rear door. The empty can compartment is underneath the floor and is accessible through doors at rear.

The body is equipped with a mechanical refrigeration unit located on the top of the body at rear of cab. It is covered by a removable metal hood which makes it easily approachable. The means of operating this unit is designed to eliminate the inconvenience and trouble often experienced in obtaining power for this purpose. When the truck is in the service station or loading room the compressor can be operated from local light current; on the road it is driven by a small stationary gasoline engine. This arrangement provides a flexible unit and eliminates the power take-off which often is troublesome.

The walls are built of a triple combination insulation, consisting of Met-L-Wood, Dry Zero blankets and Insulite, which, when used together, not only provide satisfactory insulation for low temperatures, but contribute to the light weight of the body, on which principle the construction was formulated.

The new body's initial appearance is to be made the week of October 20th at the Dairy Industries Exposition at Cleveland. It will be on view in Booth E-110, where engineers will explain many of its construction features.



Eliminating Discoloration in Frozen Fruit

By M. A. Joslyn
Fruit Products Laboratory, University of California

ANY successful method of preserving fruits by freezing, especially for retail distribution in small containers, will have to control or eliminate the change in color and flavor due to oxidation in the presence of air and loss in texture due to cell injury on freezing. Freezing berries for the preserver, jam and jelly manufacturer and baker was a comparatively simple matter compared to freezing a large variety of fruits for the retail trade. The preservation of color and flavor in berries, which are relatively resistant to oxidation, was all that was necessary, the preservation of texture being of secondary importance. However, the ice cream manufacturer objected to the flavor of the exposed berries and experienced some difficulty in manufacturing a satisfactory strawberry ice cream.

The inception of the small package of frozen fruit for retail distribution definitely showed the packer that, after all, preservation by freezing was not a simple matter and was far from being "foolproof." The activities in this field in the last two years have shown that not only were the present facilities for distribution highly inadequate, but also that the preservation of fruit by freezing in small containers destined for retail distribution could not be carried out by the "hit or miss" methods used in barreling. The average housewife was far more critical of the appearance, flavor and texture of the fruit and was more ignorant of its proper use. The formerly widely prevalent idea that anything and everything could be packed by the existing methods was readily dissipated by investigators in this field.

It is the object of this paper to point out the nature and possible control of the two most important difficulties met with in the preservation of fruits by freezing.

Oxidation Creeps In

Fermentation, molding, souring and changes due to anaerobic respiration in fruit can be readily controlled by prompt chilling and rapid freezing. However, if fruits are improperly packed, darkening of the tissues, deterioration of color and development of unnatural flavor occur even at freezing temperatures, owing to the oxidation of certain constituents of the fruit. This oxidation is due in great part to the activity of the oxidizing system, or oxidase present in the fruit tissues which is not inhibited by storage at temperatures as low as –10° F. Although the fresh fruit is resistant to oxidation, the injury to the tissues on freezing allows mixing of the cell contents with consequent rapid oxidation upon exposure to the air.

Oxidation will not occur unless the following four components are brought together in the fruit tissues:

(1) Air or oxygen.

(2) Oxygenase, which is capable of taking up oxygen from the air in an active state and thus forming an organic peroxide.

(3) Peroxidase, which has the power of causing rapid transfer of the oxygen derived from the organic peroxide to the compounds which undergo oxidation and thus behaving as an accelerator of this oxidation process.

(4) Chromogen, which is a substance of tannoid nature that, upon being oxidized, gives rise to a brown pigment.

In a living plant, or fruit, these substances seem not to be present together in the same part of the cell, and the oxidizing enzymes present only function in the respiration of the fruit. Upon freezing to death of the fruit, or other cell injury, the protoplasm loses its power of selective permeability, diffusion and mixing of the above components occur and changes due to oxidation result. These changes, although they occur during freezing storage, are more profound upon thawing. Although the latter three components of the oxidizing systems are generally present in all parts of the fruit, oxidation is more profound around the pit or seed cavities, near the skin, and especially in the vascular bundles.

All the varieties of fruits are not subject to marked deterioration of color and flavor by oxidation. Some varieties do not possess a complete oxidizing system, lacking an oxygenase or organic peroxide, and in others the ozidizing system is not very active. Figs, red grapes, black cherries, plums, persimmons, pineapples and melons are practically free from deterioration due to oxidation. Berries do not posses a very active oxidizing system and suffer more change in flavor than in color. Apples, apricots, avocados, peaches, pears and light-colored cherries, plums and grapes markedly deteriorate in color and flavor when frozen in air. Of these fruits, apples brown much more rapidly, and apricots and peaches, although somewhat less rapidly, oxidize to a much greater degree, becoming almost black under certain conditions.

Fighting the Enemy

Discoloration of frozen fruit by oxidation can be prevented by (1) destroying the enzyme by heating the fruit; (2) by excluding air by packing the fruit under vacuum, or submerged in syrup; or (3) by treating the fruit with a sulfurous acid solution or other permissible agent. Although treating peeled and sliced apples, to be used for pie bakers, with sulfurous acid prior to freezing has been found successful, and the method seems promising, with peaches and apricots to be used for a similar purpose, the second method is preferable for fruit to be packed in small containers and for fruit to be used for other purposes.

Proper Heating Helps

The inactivating temperature of the fruit oxidases varies with the kind and maturity of fruit, but is generally about 165 to 180 degrees F. In heating fruit to destroy the oxidase it is necessary to heat for sufficient time to insure that all parts of the fruit reach the inactivating temperature. If this is not done, browning will occur around the unaffected parts of the fruit owing to the diffusion of air through the injured cells. Although steaming sliced, mealy apples for 3 to 5 minutes at 212 degrees F. will eliminate browning and does not materially affect the texture and flavor of these fruits if they are cooled thoroughly immediately after blanching, this treatment is not satisfactory for delicately flavored fruits to be used for purposes other than in pie making.

If fruits are frozen submerged in a suitable syrup, oxidation does not occur during freezing or freezing storage. However, if the fruit is exposed to the air after thawing, rapid oxidation occurs, not only in the fruit, but also in the syrup used. The syrup pack method for small containers is not entirely foolproof, especially when the housewife empties the container and serves it exposed on a platter. Where frozen fruit is to be used in canned fruit salad, jams or jellies, no browning will occur if the frozen syrup-packed fruit is rapidly thawed with steam or in hot water and immediately heated to inactivate the enzyme.

Vacuum packed fruit is not entirely free from oxidation during thawing, in the can, especially if the fruit possesses a rather stable organic peroxide. It is practically impossible, during the short evacuation of the can of fruit, to free the fruit tissues from occluded air, especially where whole or halved fruit is evacuated. The air left in the fruit tissues brings about oxidation during thawing in the can. To limit this oxidation, it is necessary that a high degree of vacuum be obtained. It has been found that this difficulty could be further eliminated by packing the fruit in syrup prior to evacuation. A minimum of oxidation occurs in syrup-packed evacuated fruit, and such fruit, when thawed in the can and consumed promptly after thawing in the sealed can, is practically natural in color and flavor.

Injury to the tissues on freezing, which causes a soft and limp and soggy texture upon thawing, is more than

(Concluded on Page 8, Column 5)

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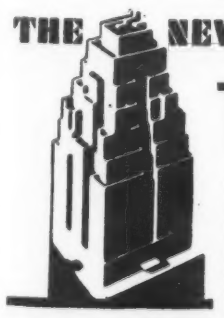
to stop at
THE NEW YORKER



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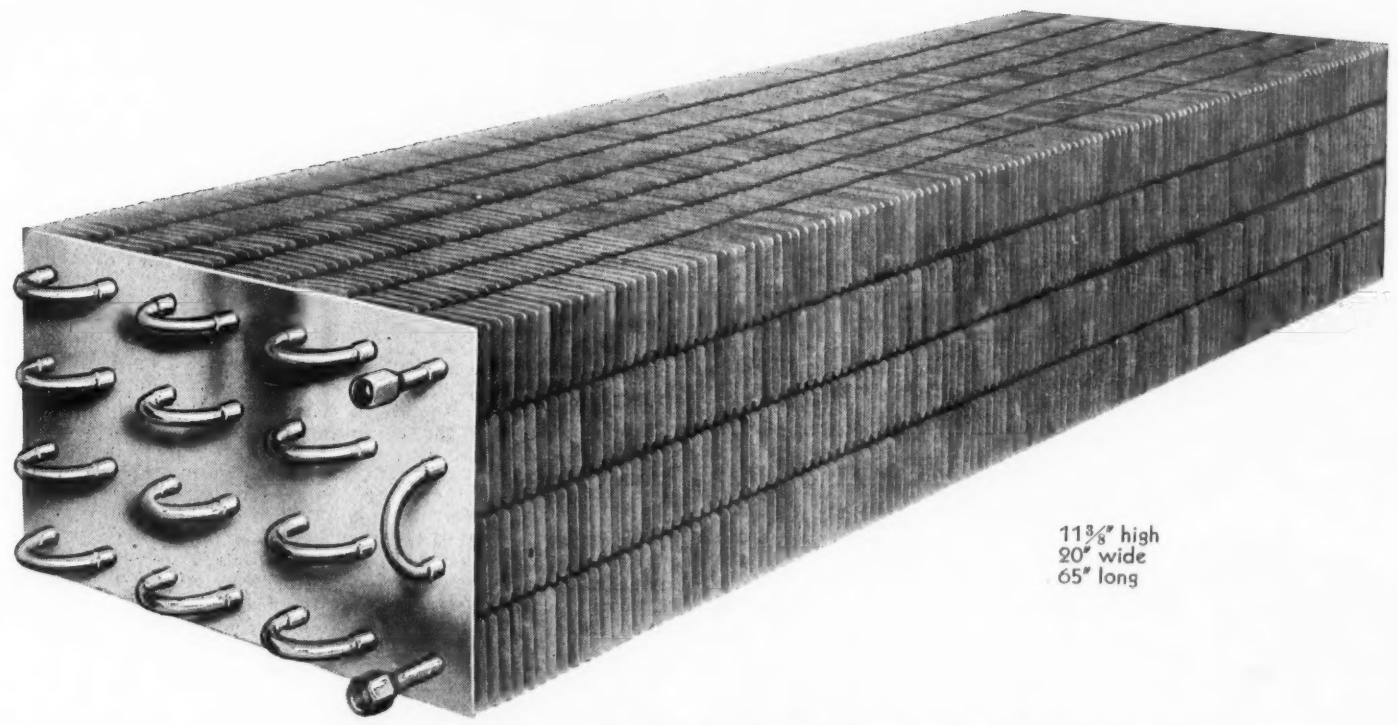

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Billions

GOVERNMENT statistics in regard to the dairy industry show, that next to the raising of livestock for slaughter, it is the largest single branch of agriculture, the annual value of dairy products being estimated at nearly $3,000,000,000. So far as the farmer is concerned, milk is ahead of every other product as a producer of actual cash. And there are indications that the volume of milk and other dairy products consumed is not only keeping pace with the increase of population, but is gaining even more rapidly.

For the last three years, according to the United States Department of Agriculture, the number of dairy cows has been increasing and the estimated number in the country on January 1, 1930, was 22,490,000 head.

First among the handmaids of the dairy industry is refrigeration. The old spring house, so dear to memory, was used chiefly to preserve the milk and butter and cheese. As a matter of fact, the old spring house is still doing duty on many dairy farms, usually in connection with mechanical refrigeration. The man who starts off with a cool, freely-flowing spring on his farm has an asset which teams up well with modern refrigeration equipment.

The continual advance of electric power in the rural districts of the country has greatly increased the market for milk coolers. The more rigid temperature requirements constantly being imposed by great cities on their sources of milk, also help to enlarge the market. Those two facts, taken in conjunction with the increased consumption of dairy products referred to above, make it advisable for every refrigeration distributor and dealer who handles milk coolers, or has a chance to handle them, to get busy. The market is there, it is up to him to get his share.

Fruits

THE conference which is to be held at the Georgia Experiment Station on October 10th, is likely to bring out much valuable information in regard to the freezing of fruits and vegetables. Dr. H. P. Stuckey and his assistants, headed by J. G. Woodroof, have been freezing a wide variety of products under varying conditions, and the results of their work should help to settle many disputed points.

In the last few months the novelty of quick-frozen meat has somewhat overshadowed the quick-freezing of other foods, but those familiar with the new movement realize that fish and fruits have led the way so far as commercially successful freezing is concerned. Thus far no producer of quick-frozen meats has made any real money.

The story of quick-frozen fish has been told again and again. A number of large companies are operating successfully and making substantial profits. Better yet, their distributors are making money, too.

The story of frozen fruits remains to be told. It is still a collection of fragments, men working independently in different sections of the country, turning out products that are finding their way to the public by different channels. There is little communication between them and they often know nothing about what the other fellow is doing.

Despite this handicap, the business is growing by leaps and bounds. This year for the first time a substantial portion of the Georgia peach crop was frozen, thus saving vast quantities of fruit that in other years has rotted on the ground. The cherry growers of Wisconsin, Michigan and New York have been freezing cherries and selling them to the pie bakers. Frozen strawberries have been popular at the soda fountain for at least two summers. Out in the Northwest greater quantities of fruits and vegetables have been frozen than in any other section of the country.

It is to this fast growing branch of the freezing industry that the Georgia Experiment Station has addressed its studies. It has gone into the subject thoroughly, one of the most interesting features of the work being the testing of different types of containers.

The gathering down in Georgia is a little family affair, restricted to those who have coöperated with the Station in the freezing experiments. Its value to the industry promises to be great.

THE ELECTRIC MILK COOLER

Its Possibilities, Its Desirability, and Its Ability

THE application of electric refrigeration to milk cooling is finding widespread favor, both because of the convenience and economy of electric refrigeration, and because of the added premiums made possible through its use. These premiums are sometimes sufficient to pay the entire monthly installments on equipments purchased on the budget payment plan.

Legislative influence in many sections is responsible for the rapid adoption of electric refrigeration.

The application of electric refrigeration to dairies involves many and varied factors. Some dairies depend solely upon the refrigerating equipment for the extraction of animal heat from the milk. Other dairies have an abundant supply of well water or spring water which can be used for pre-cooling the milk, thus relieving the electric refrigerating system of a large portion of the load. In some cases, the load must be computed from high pasteurization temperature.

In some dairies, the submersion type of cooler is employed (milk in large cans being immersed in water that has been chilled by the electric refrigerating system). It is a common practice to accelerate the cooling of milk by pouring same over an aerator or tubular cooler, through which this cold water is circulated. Obviously there is little difference between the heat load (aside from the slight losses of the circulating system) of these two methods, unless an independent water supply is used through a portion of the cooler, as mentioned above.

For general purposes of calculating heat loads, it is customary to consider 90° as the temperature of fresh milk. Sixty-five degrees is similarly employed as the temperature to which well water or spring water will pre-cool the milk which is then to be sub-cooled by the electric refrigerating system. **Obviously,** this 65° figure will vary according to the temperature of the available supply of cooling water.

In contrast to the bulk storage of milk, as practiced by many dairies, others will bottle the milk immediately after cooling and will store the cased bottles in a milk house. Under such conditions, it is possible to provide a refrigerating system for the milk house and a separate system for pre-cooling a volume of water sufficient to meet the demands of the dairy (according to its output) in pre-cooling the milk by aeration.

In other instances, a single system may be designed to serve both purposes —the milk house being cooled by a large brine tank, the cubic contents of which are sufficient to meet the requirements of the aerator.

The Selection of a System for Milk Cooling

The submersion type of cooler (wherein bulk milk is cooled by being submerged in a bath of cold water) offers the simplest problem for consideration. In fact, the manufacturers of milk storage cabinets ordinarily rate their cabinets with regard to the capacity or quantity of milk that can be handled and the capacity of the electric system required. Obviously, the capacity of such a cabinet may be limited by either one of two factors—(a) the number of cans of milk that can be submerged in the cabinet or (b) the volume of water within the cabinet having a limited capacity for heat interchange with the volume of milk to be cooled—according to the starting and finishing temperatures of each.

For milk houses or "dry cooler" it is necessary to compute the heat load through the walls of the milk house in the same manner as employed with any commercial refrigerator.

Inasmuch as such milk houses are generally in active use only during the morning and evening milkings, a usage factor of 1.2 is generally found adequate. The size of such a house is, of course, determined by the requirements of the dairy. U. S. Department of Agriculture figures indicate that one square foot of interior floor space should be allowed for every ten quarts of milk in bottles in cases. This provides sufficient accommodations, when cases are stacked to a normal height, and permits approximately 33% overload by means of stacking cases a little higher than is normally found convenient.

It is generally expedient to build such milk houses with 4″ corkboard walls, which, with wood sheathing, may roughly be considered as a 6″ wall—thus all exterior dimensions would be approximately a foot greater than the interior dimensions—a height of 7′ inside (8′ outside) generally being adequate. The space occupied by the cooling unit and its bunker can easily be arranged so as to avoid interference with the walk-in door and to permit of cases of milk being stacked thereunder without inconvenience.

Because of the many variables encountered, it is practically impossible to determine the requirements of dairies, excepting by individual surveys and careful analysis of the findings. The entire matter of heat load determination involves only the simple but thorough and honest regard for facts that govern the entire field of commercial refrigeration.

A quart of milk weighs approximately 2.15 pounds and has a specific heat of approximately .93. For simplicity in computation, we can consider each quart of milk as being two pounds, with specific heat of 1.0, or use the same values as for water.

Comparing Weights

Bottles may be regarded as weighing the same as the milk which they contain, but glass has a specific heat of .2, or approximately 1/5 as much as milk. Wooden cases for the bottles weigh approximately ⅝ as much as the milk which they will accommodate, but have a specific heat of only .11.

Thus we find that for each quart of milk in bottles in cases, we must extract 2 pounds x 1 B. T. U. for the milk for each degree that is to be cooled, plus 2 pounds x 2/10 B. T. U. for the bottle, plus 10/8 pounds x .11 B. T. U.'s for the case, or a total of 2.54 B. T. U.'s per quart of milk per degree of pull down. In other words, we can say that the demands incidental to cooling bottles and cases through the same temperature range that milk is cooled is approximately 27% of the requirements for cooling the milk itself—allowing for normal losses in the aerator, etc., we can increase this figure to 35% or 40% in determining the heat extraction required.

Thus will 300 quarts of milk handled daily and cooled from 90° to 45° involve a heat extraction equal to 600 lbs. x 45° x 1.40, or 37,800 B. T. U.'s. This figure is exclusive of heat losses through the walls of a milk house.

A brine tank system, designed to both cool a milk house and contain sufficient brine for circulation through an aerator, must have sufficient vertical surface to handle the heat extraction required for the milk house itself. It will be recalled that a brine tank, containing brine held to an average of 20° will absorb 720 B. T. U.'s per square foot of vertical surface per day if the interior temperature averages 40°.

The following paragraph indicates the method of determining the net cubic contents of such a tank.

The daily output of a dairy is roughly divided into two equal yields—a morning milking and an evening milking. Thus, a 300 quart daily yield may roughly be considered as a 300 pound morning yield and a 300 pound evening yield.

We have previously found that bottles, cases, and other requirements may be considered as increasing this weight 40%. It is also obvious that the cold brine in the brine tank, in extracting heat from the warm milk, can never (when the entire mass average tempera-

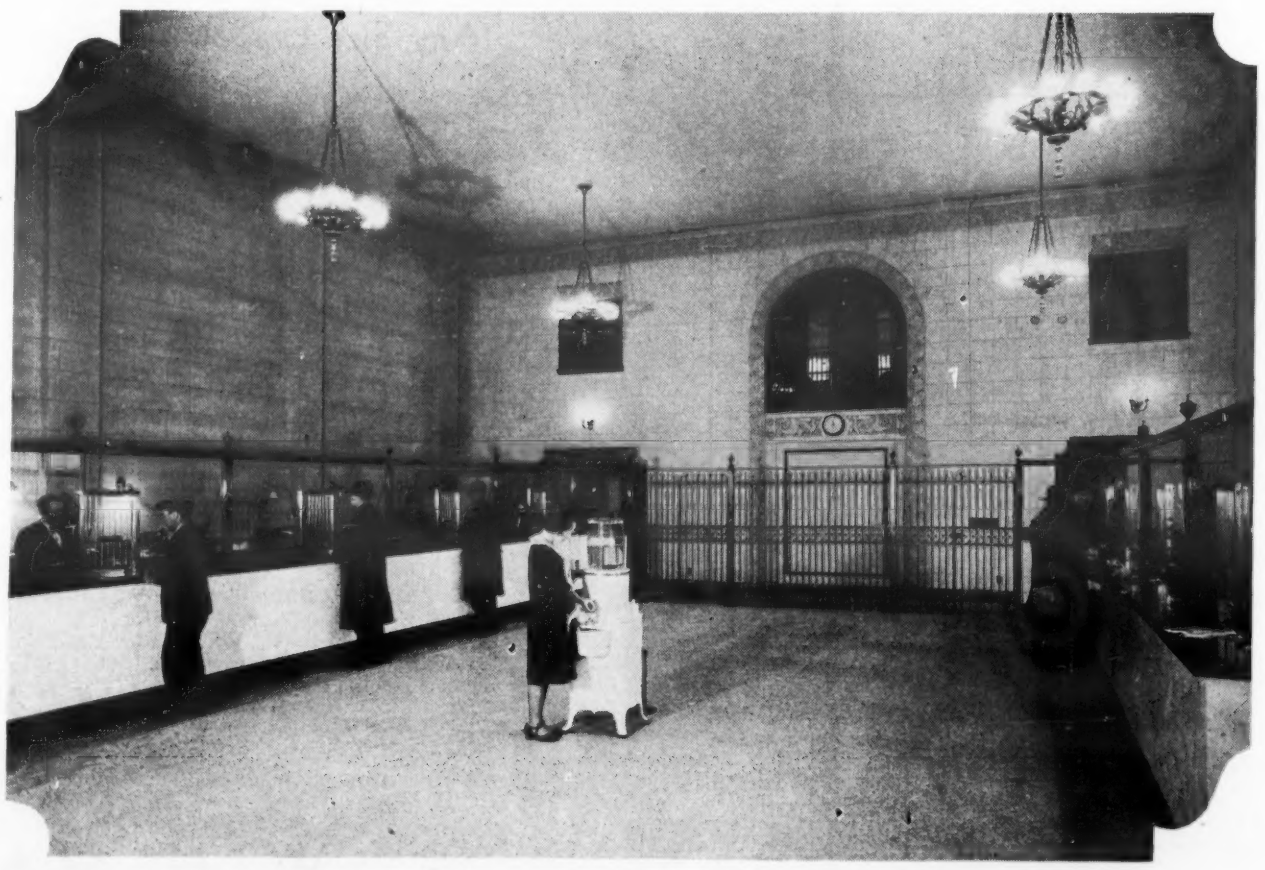
(Concluded on Opposite Page)

Clarity

THE clear exposition of the milk cooler's place in the modern dairy, which appear on this page, was extracted—with permission—from the commercial sales manual of the Welsbach Company. The name of the actual author is unknown, but he gives every indication of knowing his subject from top to bottom.

As he points out in an early paragraph, a combination of forces is enlarging the market for milk coolers every day.

Cynosure



ELECTRIC water coolers are proving their usefulness in all sorts of business buildings, but usually they are placed in some corner where they have little chance to shine in the public eye. Not so in the Milwaukee bank in which this picture was taken. The G. E. water cooler was placed in the very center of the main banking floor and during the hot weather did a rushing business. The business man entering the bank could not help seeing it and contrasting its appearance and efficiency with some of the older types of coolers.

Model Dairy Plant

Refrigeration in a typical rural environment interested many who inspected this model dairy farm.

Syracuse, N. Y.—The State Fair was especially interesting this year and drew an unusually large number of visitors from the surrounding territory.

The agricultural exhibits were numerous and many of them gave evidence of the march of progress. This was particularly true of the model dairy plant exhibit, the first time a demonstration has been made at the State Fair of the whole story of milk production, from the "cow to the can." A herd of Holstein Friesian cattle was kept in the agricultural building during the Fair. The cows were milked regularly by machine, and the milk handled exactly as it is on some of the more modern dairy farms throughout New York State.

The interior of a model milk house in which Kelvinator-Syracuse, Inc., installed a regular six-can concrete vat, attracted much attention, according to F. H. Fenn, general manager. The coil used in the vat was built in the plant of the Syracuse concern.

A feature of the exhibition was the model store in which foods were prepared daily and then distributed to visitors for sampling. The milk played a prominent part in the recipes used. Kelvinator electric refrigeration was used to store and display the food products.

MILK COOLING

(Concluded from Opposite Page)

ture is considered) quite attain the temperature to which the milk is to be cooled. In fact, it is desirable to limit temperature increase of this 20° brine to 10°—a high point of 30°—so that it will continue to accomplish refrigeration of the milk house. The brine tank must therefore have a volume which, in relation to 1.4 times the volume of milk cooled at each milking, bears the same relation that the number of degrees pull down in milk temperature has to the 10° movement in average brine temperature.

Thus, a 300 quart daily yield (representing a 300 pound yield or 150 quart yield twice daily, if cooled from 90° to 45° by an electric refrigerating system, of the type in consideration, will require a brine tank with a capacity in quarts equal to 150 x 1.4 x (90-45) /10 or 945 quarts. Inasmuch as there are approximately 30 quarts to a cubic foot, the brine tank will thus require approximately 31.5 cubic foot contents. It is a simple matter to proportion or design a brine tank in accordance with the interior dimensions of the milk house having the necessary cubic foot contents and vertical surface determined as above described. A surplus capacity is, of course, desirable to take care of unforeseen contingencies—a possible increase in dairy yield and abnormal conditions that may develop.

Tubular Coolers

Aerators or tubular coolers are proportioned so as to permit of cooling milk to within three or four degrees of the temperature of the cooling medium. On the basis of proportional volumes, according to the permissible temperature movement of the cooling medium as above described, it will be found that lowering the temperature to which the milk is to be pulled down will occasion a tremendous difference in the quantity of cooling water or brine that is necessary. This is particularly evident when "sweet water brine" is employed. "Sweet water brine" obviously cannot be below 32°, and in large tanks can rarely be brought below 35°. If milk is to be cooled to 45°, the mass of water cannot attain a temperature of more than 41° or 42°. Thus, the movement of "sweet water brine" is, say, from 35° to 42°, a total of 7°; 45° milk temperature change x 1.4 is 63°; 63/7 is 9, which indicates nine times as much brine water is required as milk under these conditions.

If an attempt were made to cool the milk to 40° from 90°, we would have a 50° temperature movement of the milk, which, when multiplied by 1.4, gives a total of 70. In this case, however, our "sweet water brine" could only range from the 35° minimum to a 37° maximum, which is a range of only 2°. 70/2 is 35, indicating that approximately thirty-five times as much water as milk would be required under such conditions. Obviously, practical limitations govern pull down temperature of milk in an aerator. Ordinarily, a minimum temperature of 45° is considered highly satisfactory, and the bottled or bulk milk at 45° is then placed in a 40° dry storage room or a 35° water bath, according to the practice of the dairy for storage purposes. The gradual pull down of the product to these lower temperatures should be computed in determining the total daily heat load of the plant. Generally, the night milking will be pulled down to the storage temperatures, and the morning milking will be pulled down only to the aerator delivery temperature.

PHOTOSTATS

Tell Cost of Operation

Mt. Clemens, Mich.—Commercial prospects who raise the question of operating cost of refrigerating equipment are very easily convinced by a novel method employed by the Montgomery Engineering Co., Jersey City, Copeland distributors for northern New Jersey. Photostatic copies of electric current bills rendered various Copeland users in Essex County are carried by the salesmen so that they can be produced when the arguments get hot on this point.

The "Copeland Ice Cube" for September gives large display to two photostatic copies of bills sent in by J. A. Ferrell, manager of dealer sales for Copeland Refrigeration Company of New York. Copeland officials believe this is the first time that photostats of electric current bills have been put to use in the refrigeration field. The two which are reproduced in the "Ice Cube" have the qualifications of suddenly closing the battle about cost of maintenance. One month's bill for Candela's Grocery and Market, West Orange, with an 8' x 6' x 10' walk-in cooler and an 8-foot display case, equipped with a 1X condensing unit, 1-86 coil and 1-8-T, totaled $6.99. Bittel's Butcher Shop, in East Orange, had a $5.76 electric bill for a 10' x 6' x 10' walk-in cooler equipped with a 1X condensing unit and 1-106-C coil. In both instances the kilowatt charge was three cents per hour. The former bill was for the April 24-May 23 period, while the latter was for May 8-June 7.

WATER COOLERS

Griffin, Ga.—The Hammond Hardware Company recently completed the installation of General Electric refrigerators and water coolers in the new $500,000 waterworks just opened in this city during the celebration of its 90th anniversary, as well as in the new high school.

STATIONARY DINER

Bridgeport, Conn.—Oscar B. Bertilson Company, 3008 Fairfield Avenue, Williams representatives in the Bridgeport area, has installed a refrigerator of 25 cu. ft. capacity in Frank's Diner, 436 Howard Avenue. It is cooled by an Ice-O-Matic of ¼ h. p. rating, with Larkin coils.

Another recent installation by the Bertilson concern was that of an Ice-O-Matic ¼ h. p. unit for Journey's Inn, restaurant at 3336 Fairfield Avenue.

SUPER
AUTOMATIC OIL HEATOR

The SUPER

Automatic Oil Heator is low in first cost. It is economical to operate. It enables you to sell two lines on one overhead.

Write for our Authorized Distributor Plan.

THE SUPER OIL HEATOR CO.
275 Connecticut Blvd.
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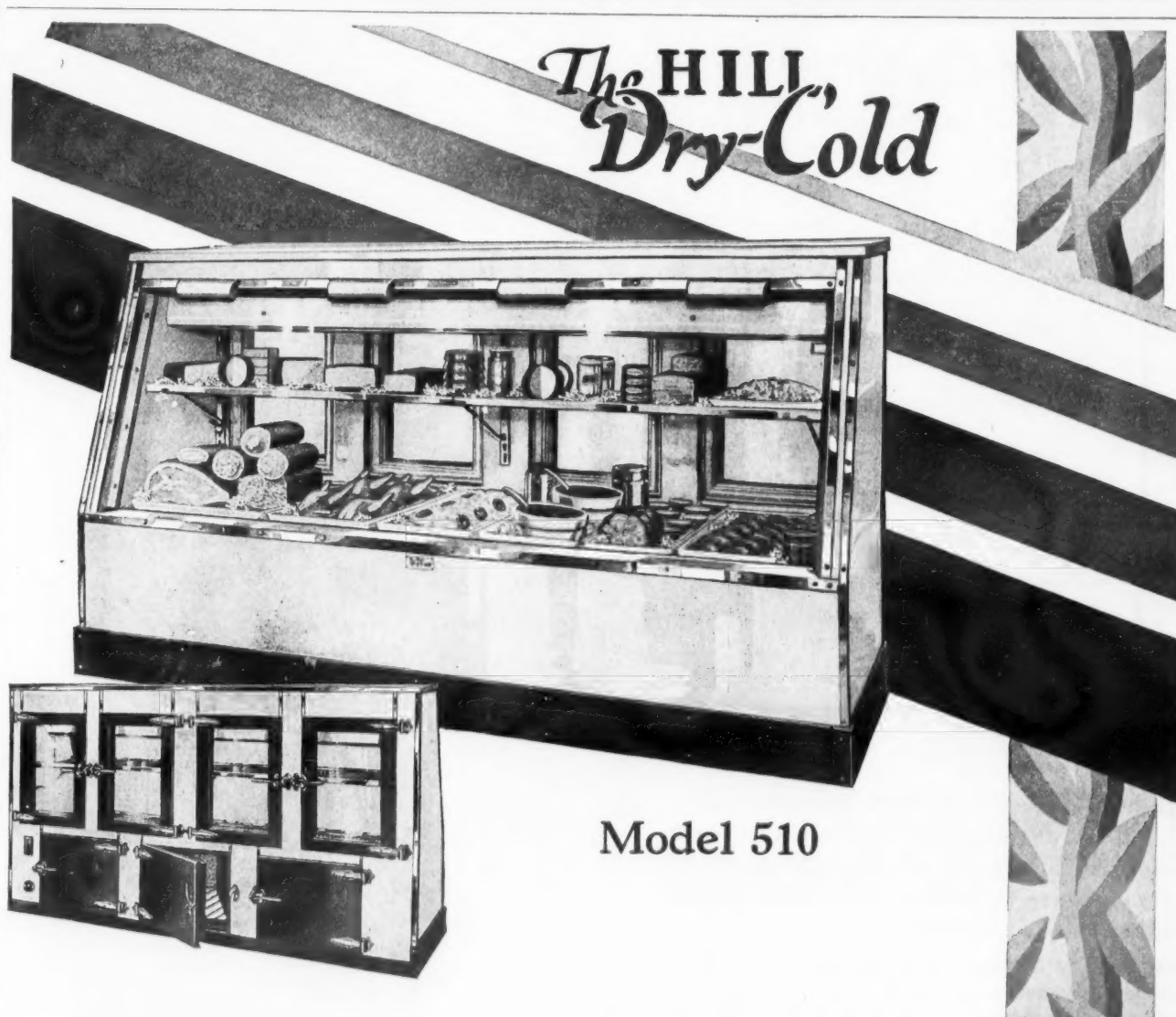
The HILL Dry-Cold



Model 510

For the Delicatessen—a case made to meet the demands of the modern delicatessen; plenty of display space to show many varieties; storage in the base for "extra supply"; large doors—make easy access to display; patented coil chamber overhead to distribute the cold air evenly; silvery Monel metal trim; outside electric illumination—keeps the heat out. There is real joy in recommending a case that the world knows as the standard of comparison and there is added satisfaction in knowing that price represents full value. More and more, those who formerly bought cases at lower prices are now turning to Hill. It fulfills their ideals as the best and backs up their good judgment of value.

C. V. HILL & CO., INC.
TRENTON, NEW JERSEY

COOLING CAROLINA

Greenville, N. C.—The Carolina Kelvinator Co., Temprite distributor for that territory, reports installations of Temprite coolers in both the multiple and self-contained individual types.

One recent installation is in the Elizabeth City Hosiery Mills, Elizabeth City, N. C. Another is in the plant of the Rosemary Mills Co., Rosemary, N. C. Temprite models 110, a white wall fixture in which the cooling unit is built as an integral part, and 220-I, a self-contained individual cooler, were used in these installations.

REFRIGERATION RUBBER WARE

Manufacturers of molded insulation for commercial and domestic refrigerator cabinets. Materials and parts developed to meet the exacting requirements of refrigeration efficiency

THE AETNA RUBBER CO.
ASHTABULA, OHIO

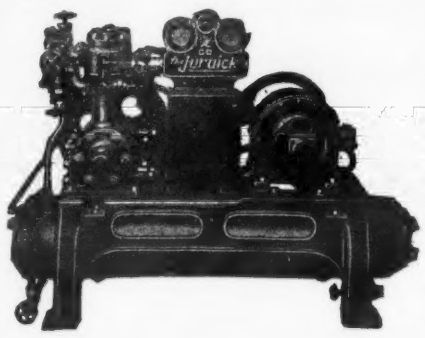
The Imitation Food Products Co.

(Branch of The Artistic Production Co.)

107 Lawrence Street
Brooklyn, N. Y.

Ask for our catalog of January 1, 1930. Direct sales only. "Indispensable with refrigerator display.

JURUICK REFRIGERATION



There is a type for EVERY need

A complete line of JURUICK AUTOMATIC units and AMMONIA COMPRESSORS of one-quarter ton to 40 tons refrigerating capacity provides economical service on big or little refrigeration jobs.

JURUICK insures smooth, silent performance, has automatic control, is easy to operate. It costs little to install and is easy for dealers to sell.

AMERICAN ENGINEERING COMPANY
2420 ARAMINGO AVE., PHILADELPHIA, PA.

Your Cabinet INSULATION ··has it?

—*High Thermal Insulating Efficiency* ..... ✓
—*Continuous Freedom from Odors* ✓
—*Durability—Long Life* ..... ✓
—*Imperviousness to Moisture.* ..... ✓
—*Rot and Mold Proofness* ..... ✓
—*Structural Strength* ..... ✓
—*Adaptability to Speedy Assembly* ✓
—*Lightness in Weight* ..... ✓
—*Price Stability and Economy* .. ✓
—*Domestic Source of Raw Material Supply to Insure Prompt Steady Deliveries* ..... ✓

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IF You can check all these important insulation requirements your cabinet insulation material will be

INSULITE
the Wood-Fiber Insulating Board

INSULITE combines all the necessary qualifications for correct cabinet insulation—high insulating efficiency—continuous durability—sturdiness—lightness—it is odorless and will not absorb odors.

Insulite is made from the tough fibres of northern woods. It is chemically treated to resist moisture and will not rot, mold or disintegrate during the entire life of the cabinet.

Insulite is furnished cut to size, ready for installation . . . reducing labor costs and material waste — speeding up production.

Furthermore, the public knows the high insulating value of Insulite — "Insulated with Insulite" means something.

May we send you samples and additional information?

JUST MAIL THIS COUPON

THE INSULITE CO.
(*A Backus-Brooks Industry*)
1200 Builders Exchange, Dept. 30J
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Offices in All Principal Cities
Please send me your folder on "Refrigerator Insulation", and also sample of Insulite.
Name.....
Address.....
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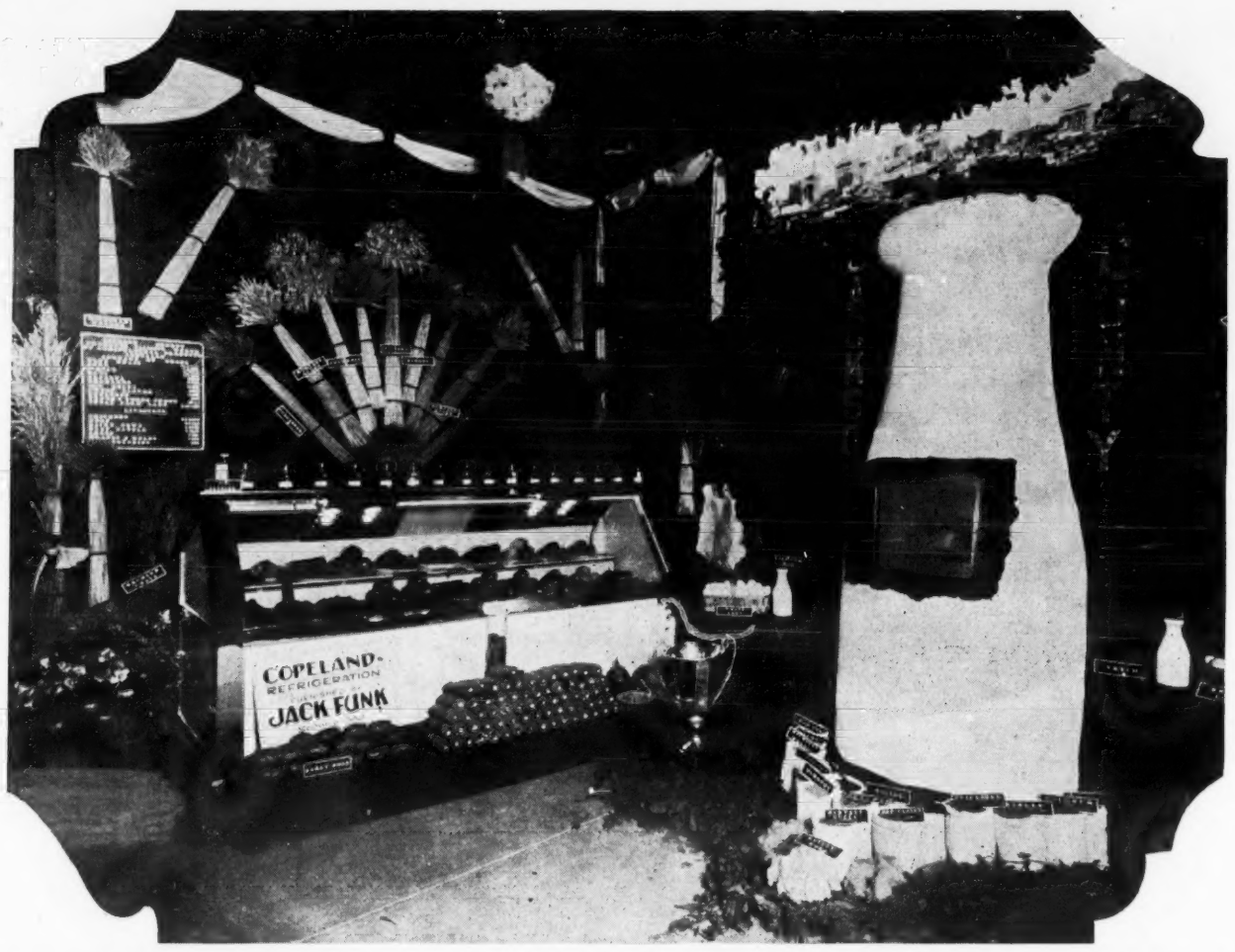
INSULITE
the Wood-Fiber Insulating Board

Copeland Helps to Win Cup



Kansas City, Mo.—Copeland refrigeration helped Jackson County win the cup for the best display of agricultural products at the Missouri State Fair by keeping sweet and fresh the fruits, vegetables, meats and dairy products on display.

Thirteen counties had displays and competition was keen. Robert S. Clough, county agent for Jackson County, assembled more than one hundred products in an unusually attractive booth.

It included, in the perishable portion, all the seasonable fruits and vegetables and, of course, a full line of meats and dairy products. These were kept in perfect condition the entire week by the Copeland.

The Copeland was installed by Jack Funk, of Sedalia, under the Copeland Company of 1524 Grand Avenue, Kansas City.

This is the first time in the history of the Fair that any kind of refrigeration has been used to keep perishable products, the procedure being to remove the products as they deterioriate.

FROZEN MILK

Interests British Dairies

THE material which appears below, describing a new process for freezing milk, is reprinted from the September issue of *Cold Storage and Produce Review*, British refrigeration publication. In addition to the descriptive article, the leading editorial is devoted to the same subject. Neither article nor editorial gives the names of those responsible for the new process, but it is deemed sufficiently important to warrant unusual emphasis. The article follows:

"Great attention has been given in recent years to improving methods of milk distribution, and today, in the larger towns at least, the supply has reached a very high standard. The convenience which would attend solidly-frozen milk, if this could be made practicable, has caused several experimental attempts at milk freezing to be made. Little success has attended these efforts, however, the chief difficulty being the separation out of the milk constituents, in order of their freezing points, during the process. According to a new process, however, the fundamentals of which were suggested by an old refrigerating engineer, and which is now being tried out by at least one large milk concern, this difficulty seems to have been overcome.

"The process, in brief, consists of subjecting the milk to a slight initial cooling to 40° F., as is now usual; it is then homogenized, the pressure employed attaining the order of 6,000 lbs. per sq. in., and finally rapid frozen. The difficulty of separation will be overcome, it is considered, by the homogenization process, and it is thought that this latter, combined with the freezing, may also render the present heat pasteurization process, which is not now considered to give perfect immunity from tubercular bacillus, unnecessary.

"The rapid-frozen, homogenized milk will be packed in non-returnable cartons in a similar manner to that employed now for ice cream, and delivered to the consumer under refrigeration.

"The advantages claimed for the process are that the present costly outlay on bottles and bottle collecting, cleaning and sterilizing will be avoided; adulteration will be rendered impossible after the milk has left the plant, the milk would remain consumable in the home for a longer period, and the likelihood of contamination be greatly reduced.

"In all probability packaged rapid-frozen milk, should it emerge successfully from its tests, will make its first appearance in this country, but the idea uppermost in the mind of the originator of the scheme was that it would provide a convenient means of supplying milk to the tropical or semi-tropical colonies. In these countries the milk supply is often derived from the native peasant, the possessor of one or two animals kept under anything but hygienic or ideal conditions. This is evidenced by the fact that most Europeans boil milk before consumption as a matter of course, and probably accounts also for the large consumption of tinned milk overseas.

"The adoption of frozen packaged milk would allow either the preparation of the milk on one large, officially controlled farm for distribution over the whole of the colony, or its importation from abroad by refrigerated transport."

UNITED-AMERICAN

UNITED-AMERICAN Soda Fountain Co., Watertown, Mass., has three types of Innovation soda fountains, namely, the Perfection, the Tandem and the Simplex. Perfection soda fountains consist of three parts, the counter and working parts, the closet base and superstructure. Tandem fountains are identical in construction to the Perfection, the only difference being in the layout. In Simplex models the counter is built integral with the unit. The majority of the Innovation models are designed for mechanical refrigeration.

The entire unit or refrigerated section, of all models, is insulated with three inches of corkboard, with linings made of heavily-tinned copper, joints interlocked and soldered. The soda water cooler consists of a battery of cylinders made of block tin and encased in seamless, fire-tinned, drawn, copper cylinders. Soda draft tube is made of bronze, silver plated and lined with block tin.

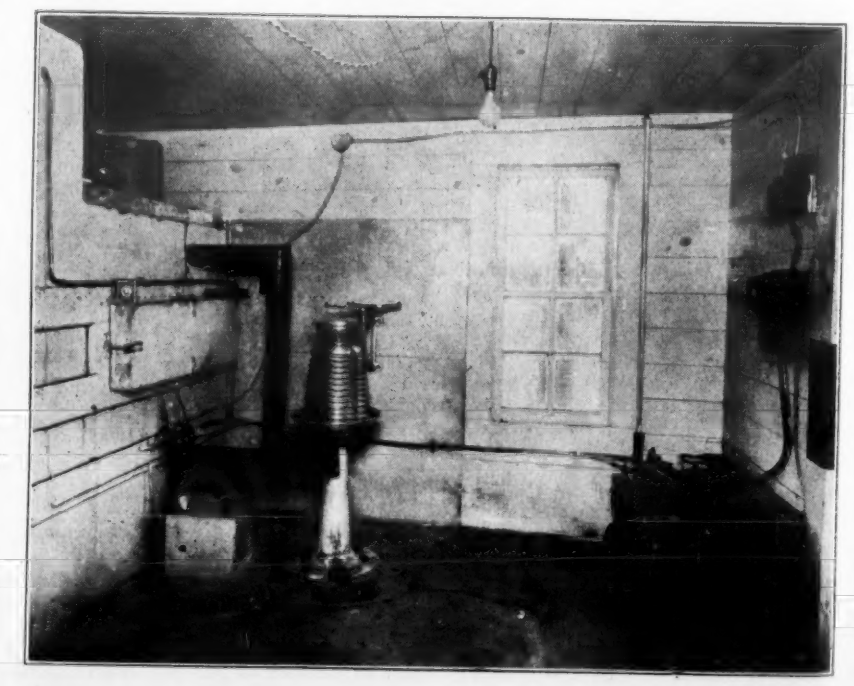
Color can be had in many of the models through a combination of marbles of various colors or marble with onyx.

SUPER-TUNA FISH BOAT

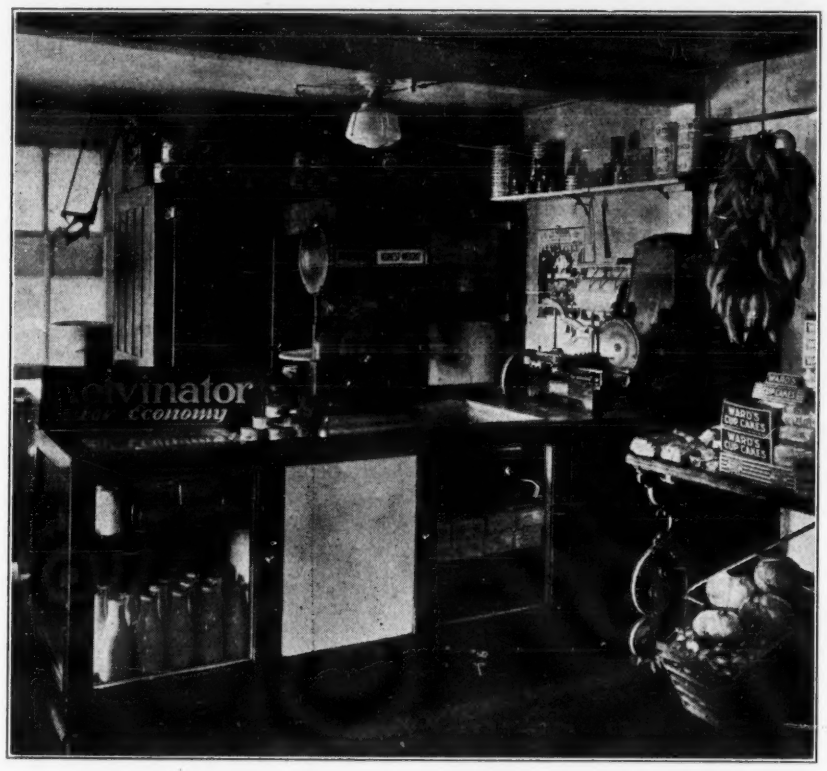
Los Angeles, Calif.—Refrigeration will have a very important role on a new super-tuna fish boat, plans for which call for the expenditure of $200,000. It will contain freezing compartments capable of holding 600 tons of frozen tuna. Plans call for adequate storage facilities for foods and supplies, so that the boat will be able to cruise in tropical waters for two months at a time.

Refrigeration for the Dairy House

The dairy house on the Wilkenson Farm at Tyler, Tex., is equipped with a Copeland unit and three 175 zero tubes. Bulk and bottled milk can be stored in the cooler.



Wide Market



HE big meat retailer in the more populous sections of this country does not stand alone as a good prospect for dairy refrigeration. He is rivaled by merchants in smaller cities who are keeping their business apace with the modern developments. Two good examples of the market for dairy cases are pictured here: the Boster Home Grove in Peoria, Ill. (above) and Jim Burke's Market, Detroit (below). Both are Kelvinator equipped.

McCRAY

THREE products in the McCray line, two of them recent additions, are adapted for handling dairy products, such as milk, butter, etc. For grocers, butchers, etc., wishing to display dairy products, McCray engineers have designed Model 3210, a display case for machine refrigeration only. In addition to the roomy display, adequate facilities are provided in the base for storage. This model is obtainable in 8 and 10-foot lengths, with insulation of three inches of corkboard sealed with hydrolene. Exterior finish is of quarter-sawed oak, with white porcelain panels and green base.

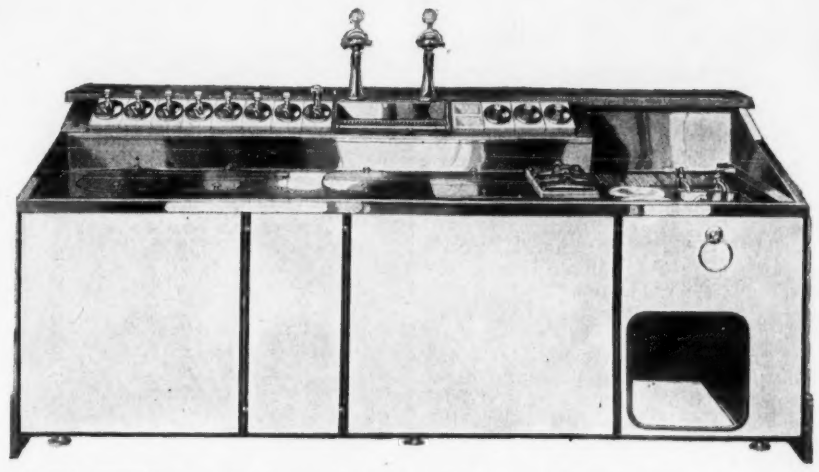
Only a short time ago, the McCray Refrigerator Co., Kendallville, Ind., added Model No. P424 to its line of refrigerators. This refrigerator has a

Model P424

semi-display for foods. It is 6 ft. 11 in. wide, 2 ft. 6½ in. deep, and 7 ft. high. Walls are heavily insulated, and the black trim stands out very well.

For dairy plants and farmers, Model No. 59 cooler has been designed. It has large capacity for cases of bottled milk.

New Russ Soda Fountain



A DEPARTURE in soda fountains has just been presented by the Russ Manufacturing Company, Cleveland, O., in the Majestic soda fountain.

The Majestic is an 8-foot unit with a tile counter. The unit is shipped complete, ready for installation, requiring only plumbing and electrical connections to put it in working operation. It is furnished in the new color-scheme style, with colored enamel facing, as well as colored syrup jars, etc.

The Majestic is made with an all-steel frame which is proof against warping or bulging. The working top is made of one piece of Monel Metal, without seams or crevices to harbor dirt. The exposed metal parts of the pump rack are all chromium plated, which eliminates the cleaning worries for that part of the fountain. A damp cloth is all that is required to maintain a brilliant polish.

Four inches of corkboard insulation is used in the Majestic. The patented stub brine tank, as used in the more expensive Russ fountains, is also included in the Majestic. This assures the proper temperature for brick ice cream at all times, as well as an even consistency of bulk ice cream from top to bottom of the can.

The Majestic contains one ten-gallon brick ice cream compartment, two ten-gallon bulk ice cream compartments, seven syrup pumps and jars, one lever action chocolate pump and jar, three crushed fruit jars with ladles, one porcelain spoon holder, a sink with overhead faucet, one refrigerator compartment with two jars for crushed fruit and one for whipped cream, and a convenient towel ring.

The counter is made of Russ Art Tile cemented on asbestos board in metal frames and attached direct to the steel frame of the unit, with a black marble top slab.

ATTENTION

Service Managers of Cabinet Service Departments

By having J. Moss & Sons replace your monel tops, panels, collar rings, revamp old lids like new, and other worn or broken parts, your present ice cream cabinet can be reconditioned to look and wear like new.

We give you the highest quality obtainable and our prices will save at least 20 per cent on replacement expenditures. And you can depend on our prompt service. Write or wire for price lists and additional information.

Also Manufacturing Sheet Metal Parts and Stampings

J. Moss & Sons
630 Hudson St. New York City

DRAYER & HANSON

DAIRY coolers, constructed in five different styles, are being marketed by Drayer & Hanson, Inc., Los Angeles. Model B is designed for brine cooling and has no storage in connection. It is constructed in seven sizes for cooling bulk milk. Two coolers, Models 120-S and 250-WS, have the brine tank at the top, with the storage compartment below. Storage capacities are six and twelve 10-gallon cans of milk, respectively.

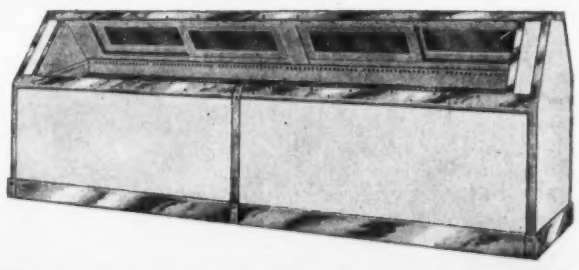
Models 100-S, 150-S, 200-S, 300-S and 350-S have the brine tank at the right end, with storage at the left. Slightly larger, Models 250-S and 400-S have the storage in the right-hand corner. For dairies requiring large coolers, D & H has Model 240-C, which is of the walk-in type. Rounding out the Drayer & Hanson line are Models 82-RS and 150-RS, with storage directly below the brine tank. Two doors open into the storage compartment. Bottled milk can be stored in all models, except Model B.

Exteriors of all models are of tongued and grooved Oregon fir ceiling with steel corner guards. Finished overall with three coats of white lacquer.

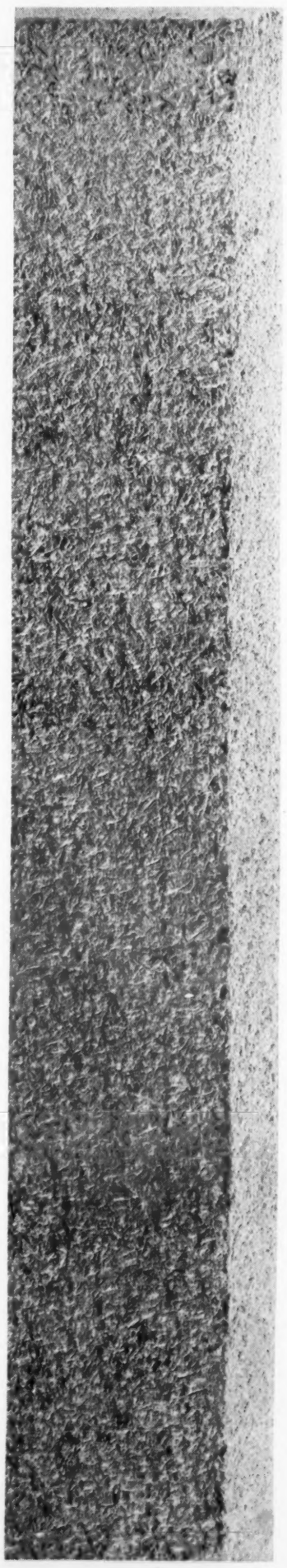
Commercial Refrigerator Equipment

For All Purposes

STOCK or SPECIAL BUILT



BANTA REFRIGERATOR COMPANY
CLEARFIELD, PENNSYLVANIA



Clean... Odorless... Sanitary...

The cane fibres from which Celotex Refrigerator Insulation is made are carefully cooked and washed, removing all impurities . . . and then sterilized in a temperature of 420° F.

Every fibre is treated with waterproofing chemicals so as to resist the absorption of moisture . . . for water destroys the effectiveness of insulation.

The fibres themselves are entirely odorless. The finished insulation is sanitary in every way.

A special kind of Celotex. . . The Celotex used to insulate refrigerators is fabricated by special processes that increase its insulating efficiency to the highest possible point. It fully satisfies the strict requirements of refrigeration engineers.

No heat leaking joints or seams. . . The open joints and seams which impair the effectiveness of many materials are eliminated with Celotex Refrigerator Insulation. It comes cut to fit exact specifications so that each insulated area is covered with a single board of the proper length, width and thickness. *This* insulation can never settle, sag or break loose with time.

Stronger, more substantial cabinets. . . . The strength and rigidity of Celotex braces the walls and framework of the cabinet . . . adds lasting structural strength to resist the constant weaving strains caused by changing room temperatures. Celotex-insulated cabinets have longer life.

These Facts Will Help You Sell

Talk Celotex Refrigerator Insulation to every customer. Use these facts to prove the superiority of Celotex-insulated cabinets.

Home-owners already know the name *Celotex* . . . know how it resists heat.

Tell them this special kind of Celotex has even greater insulating efficiency . . . that it insures better refrigeration for less expense.

THE CELOTEX COMPANY
919 North Michigan Avenue, Chicago, Illinois. *In Canada:* Alexander Murray & Co., Ltd., Montreal. *Sales distributors throughout the World.*

The word
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the trademark of and indicates manufacture by
The Celotex Company, Chicago, Ill.

CELOTEX
BRAND
INSULATING CANE BOARD
REFRIGERATOR INSULATION

MILK

Properly Cooled Brings Premium Prices

By Walter E. Landmesser
Manager Commercial Division, Electric Refrigeration Department, General Electric Company

DISTRIBUTORS of General Electric refrigerators in all sections of the country are reporting increased sales of General Electric milk coolers to progressive dairy operators. Within a short time four General Electric milk coolers, in addition to water coolers and other G. E. products, have been sold to dairies in the vicinity of Augusta, Georgia. Milk coolers and commercial refrigerators also have been installed in various large and small dairies and institutions throughout the country.

The installations at Augusta were made by N. A. R. Lawrence, in charge of commercial sales there for the Georgia Power Company. He installed milk coolers in Johnson's Dairy, Taylor's Dairy, Thomas' Dairy, and Skinner's Dairy, as well as General Electric models C-270 and DB-1 water coolers at Augusta dairies. W. A. Tadlock assisted Mr. Lawrence in the installations.

Out at Des Moines, Iowa, the Warde B. Stringham Company, General Electric distributors, installed a General Electric milk cooler and a CS-602 commercial model in the milk house of the Laddvale Dairy, owned by John Valerius. Mr. Valerius originally purchased the CS-602 and he was so well pleased with that commercial model that he soon installed the milk cooler. He is especially well satisfied and says the equipment is giving excellent service.

One of the many institutions which have installed General Electric milk coolers is the Boles Orphans' Home at Quinlan, Texas. The installation of the milk cooler was followed by the purchase by the institution of a General Electric C-601 commercial refrigerator and three C-3 water coolers with cold water extensions. This institution, according to J. H. Lathrop of the commercial department, Griswold-Rogers Company, Dallas distributors, had just about decided to install another type of refrigerating equipment in a vault which it had proposed to build. About that time the heads of the institution looked over a commercial sales film which graphically depicted the advantages of the individual system, and the showing of this film is credited with forming the turning point in favor of the sale of the five units.

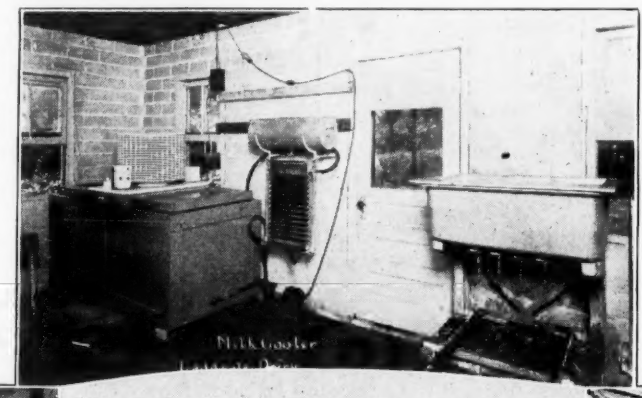
Model dairies the country over are paving the way for acceptance of the idea of electric milk cooling. For intance, the model dairy operated by J. L. Coker & Company, at Hartsville, S. C., is daily visited by large numbers of farmers interested in progressive methods. On the Coker farm modern ideas are in effect everywhere. The barns are well lighted, by both natural and artificial light. Automatic drinking fountains for the cows are installed. General Electric milk coolers keep the milk at proper temperatures.

It is predicted that 1931 will see an impressive number of dairy farms equipped with electric refrigeration and with electric milk coolers. One reason for this, of course, is the extension of electric service to rural sections. Another is the progressiveness and enterprise of dairy farmers.

With 21,000,000 cows and an annual milk production of ten billion gallons—according to the United States Department of Agriculture—farmers of this country are furnishing a universal food. The per capital consumption of milk in this country is 55 gallons per year for all purposes.

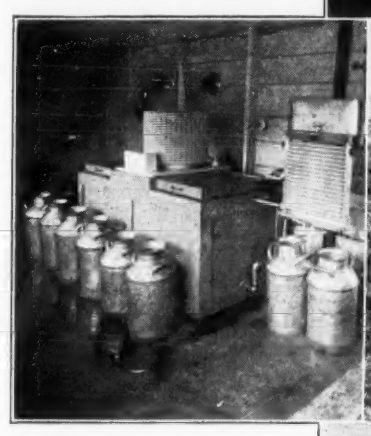
Dairy establishments which have turned to electric milk coolers are finding that their milk is of higher grade when picked up by distributing companies and in many cases they receive bonuses or premiums for milk having a low bacterial count. A concrete example of this is found in the State of Wisconsin, where grade A milk brings from 25 to 40 cents more for each hundred pounds than milk that does not measure up to a certain predetermined standard. An average sized dairy will have, perhaps, 12 cows capable of producing 20 gallons at a milking, or 40 gallons per day. During the course of a year such a dairy will have supplied more than 120,000 pounds to the milk station. Conceding that this milk is of highest quality, the dairyman will have received more than $300 in premiums, at a 25 cent rate, or, of course, a larger premium if he obtained the 40 cent rate.

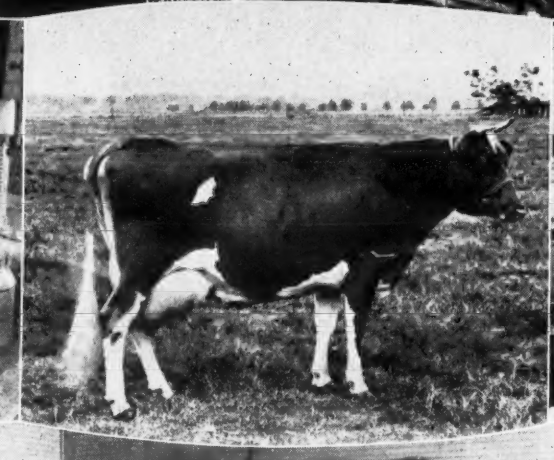
Milk Cooling Time

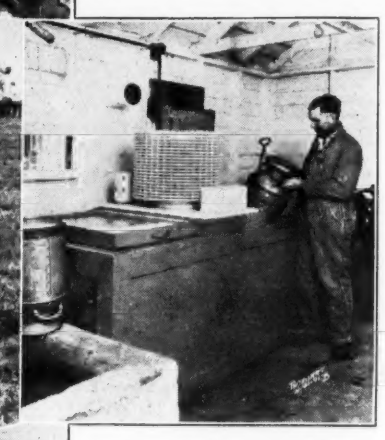


(Right) Laddville Dairy with G. E. cooler and aerator

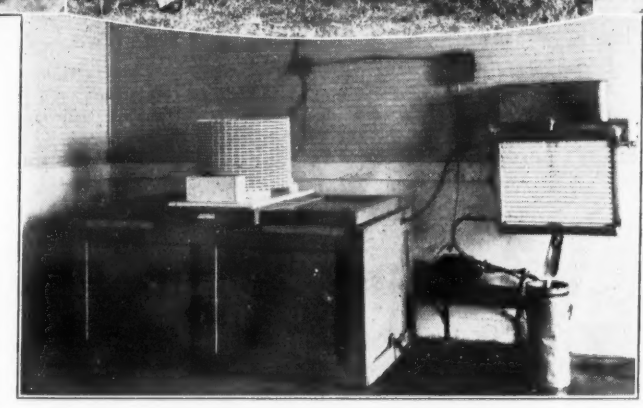
(Below) Busy spot on the Rieder Farm after milking time.







(Above) Corner of Johnson's Dairy at Augusta, Ga.



(Left) Coker's Model Dairy Farm has all modern appliances

WELSBACH

WELSBACH dealers and distributors are coöperating with the Esco Cabinet Co., West Chester, Pa., in order to meet the milk-cooling needs in their territories. Esco milk coolers, which are obtainable in a number of capacities, are installed along with Welsbach condensing units. Nine machines in the Welsbach line are adaptable to the various sizes of coolers.

The Esco cabinets are constructed to withstand heavy usage, exterior sheathing and interior being of Toncan iron. Insulation is three inches of corkboard sealed with hydrolene. All Esco cabinets for use with the Welsbach system are equipped with the Welsbach expansion valve and ARC thermostat. Aerators and motor-driven pumps are also obtainable for installation with Welsbach-Esco coolers.

KELVINATOR IN BIRMINGHAM BAKERY

Birmingham, Ala.—Installation of a Kelvinator machine in the new home of the Electrik Maid Bake Shop was completed recently by Clark & Jones, 1913 Third Avenue, North. This bakery is one of the first in the city to install automatic refrigeration.

Good Outlook

DESPITE the drought and depression, the dairy industry seems to have a good outlook, according to the item printed below, which appeared in the September *Market Letter* published by Whittlesey, McLean & Co.

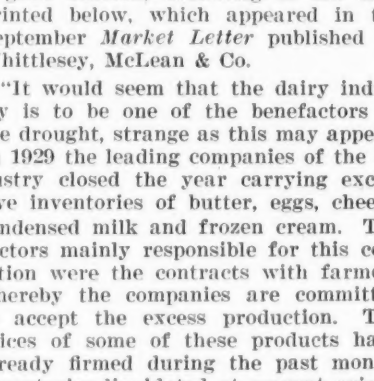
"It would seem that the dairy industry is to be one of the benefactors of the drought, strange as this may appear. In 1929 the leading companies of the industry closed the year carrying excessive inventories of butter, eggs, cheese, condensed milk and frozen cream. The factors mainly responsible for this condition were the contracts with farmers whereby the companies are committed to accept the excess production. The prices of some of these products have already firmed during the past month. Inventories liquidated at present prices, or better, could compensate for lowered consumption of these products."

HAVEN

THE Haven Manufacturing Co., Milwaukee, Wis., manufacturers of refrigeration equipment, has in its line a compact system for cooling milk.

The standard Haven compressor unit is mounted over a portion of the cover of the milk cooler, with cooling coils mounted underneath and surrounded by a metal guard. This unit is free of the tank itself and may be lifted out without disconnecting any pipes.

The standard wooden tank furnished by Haven (when specified) is of the type usually used on farms for milk cooling.



This tank is so arranged that the refrigeration unit may be placed across the center, with a space on either side of the unit for two cans of milk. The edges and bottom of the tank are protected against damage from cans. The Haven system can be used with any make of milk coolers.

In operation, the tank is filled with water so that the cooling coils of the refrigeration unit are covered. The unit is run until ice appears outside of the guard around the cooling coils. This ice formation, together with the volume of cold water contained in the tank under normal conditions, is sufficient to cool four ten-gallon cans at each milking.

OMAHA

THE Omaha Fixture & Supply Co., Omaha, Neb., is appealing to the the dairy trade with three models of display cases and one walk-in cooler. All of these models are designed so that products familiar in the dairy industry can be easily stored. Variety is the keynote of the case line, there being Model B, double duty case; Model B, top display case, and Model A, full display case.

Color has invaded the Ofsco line, and recently a Model B double duty case, finished in green and white porcelain, trimmed in gold, was installed in the Mattke-Gorman grocery at Grand Island, Neb. Both of the B models are obtainable in a number of lengths and construction is the same, except in the double duty case, the base compartment is fitted out. Front and ends are of white porcelain, with interior lining of cypress and Armco iron. Three plates of ¼" plate glass make up the display front. The full display case has two large shelves for arranging dairy products. It has ends and bottom insulated with 4 inches of sheet cork laid between felt paper and sealed with hot asphaltum.

The walk-in cooler is suitable for storage of bulk and bottled milk.

JURUICK

Philadelphia.—Juruick sales for 1930 are far ahead of last year, better, in fact, than those in any previous year in the history of this division of the American Engineering Company.

Recent engineering developments and an improved plan of merchandising have made it possible to offer this line for all commercial applications. For frozen food cases methyl chloride, as well as ammonia, is used as the refrigerant.

Juruick self-contained units are made in sizes from ¼ to 5½ tons capacity. The compressors range from ¼ to 40 tons capacity. Juruick units are applicable to dairy installations. The Juruick Cub is designed to handle small dairy jobs rating about one-quarter ton capacity.

FILTRINE SYSTEM IN LARGE DRESS STORE

New York.—A complete driking water system has been recently installed in the 13-story building, 34th Street, New York City, occupied by Bedell Company, famous ladies' dress house.

The system installed includes a Model No. 9 Filtrine, two-coil-125-gallon pressure cooler, in connection with two, 100-AW Servel machines, each connected to an individual low-side coil in the cooler.

Fifteen outlets throughout the 13 floors of the building are supplied with chilled water. One Westco-Chippewa, ⅓ h. p. circulating pump was used as a booster to the building water pressure.

DISCOLORATION

Of Fruits and How To Eliminate It

(Concluded from Page 3, Column 5)

merely a mechanical disruption of the tissues by freezing, and it is not due to merely the desiccating effect caused by the separation of the ice from the cell contents. It is probable, although the exact nature of the effect is not known, that it is due to a change in the colloidal condition of the cell. One part of agar can cause 9 parts of water to set to a stiff formation. The plant is mostly water and yet it appears firm due to this property of gels. It is known that freezing markedly affects the properties of gels, and the loss in turgidity in fruits after freezing may be due in part to a change from a stiff gel condition to a watery sol condition.

Quick-Freezing

The conditions under which injury to texture by freezing may occur in fruits are not well established at present. Previous investigations on the freezing of tissues have been almost entirely confined to animal and not to plant products. it has been shown that the distribution of ice in the tissues plays an important role in determining loss in texture on freezing. The distribution of ice in frozen muscles depends on the rate of freezing or on the form of the cooling curve. On slow freezing, the water, according to the commonly accepted explanation, leaves the muscle fibres to form ice between them, the fibres which constitute the substance of the muscle are therefore highly desiccated and the water lost during freezing is only partially absorbed. On rapid freezing ice is not formed between the muscle fibres but only within them, with the result that each tissue as a whole is not desiccated. The tissues upon thawing are found to be much less disorganized than they are when the ice separates between the fibres.

Research on the freezing of plant tissues, in connection with studies on the killing of plant tissues by low temperatures, indicates that during freezing ice forms in the tissue, generally not in the cells but in the intercellular spaces, the water moving out of the cells to form crystals in these spaces. The most commonly accepted theory is that killing from cold results from the withdrawal of water from the protoplasm. That freezing to death of plant tissues was not merely a drying phenomena was demonstrated by Prof. W. H. Chandler, who has repeatedly shown that tissue with a wet surface killed worse at a given temperature than did tissues with no moisture on the surface. Pollen grains which would survive drying at ordinary temperatures, or exposure to certain freezing temperatures, would invariably be killed when subjected to the same freezing temperatures and moistened with a drop of water before freezing or after freezing, or when frozen with water.

Low Temperature Tests

It must be borne in mind, however, that most of the studies on the killing of plant tissues by low temperature were limited to observations made at 0 degree F. or above. Under these conditions the nuclei of ice formation apparently exist at the surface of the cell in the intercellular spaces. However, it is possible that under other conditions ice formation may start sometimes within the cell, sometimes on the surface and sometimes at both places. It is certain that at a lower temperature and a more rapid rate of freezing, the distribution of ice in the plant tissues will be different from that at higher temperatures. Whether the distribution of ice in plant tissues will influence the structure after subsequent thawing is still largely a matter of conjecture. It may be safe to say that the effect will not be so profound as in animal tissues.

Until more is known about the physics and chemistry of plant tissue freezing, definite recommendations cannot be made for the preservation of texture during freezing. However, the syrup pack method tends to preserve the texture better than the sugar pack method. The exact nature of this protective effect is not known.

(In conclusion, the writer desires to express his appreciation to Prof. Chandler, who has kindly reviewed this manuscript.)

DOOR CLOSERS

AUTOMATIC door closers have been put on the market recently by the Blazek Cold Storage Door Co., Chicago, Ill. Two models, one 21 inches long and the other 29 inches long, are now in production. The operating mechanism of the door closer consists of a compression spring and an adjusting nut. Speed with which the door will close can be regulated by this adjusting nut.

These closers are designed so that they swing the door towards the refrigerator wall after it is beyond a certain point. No adjustment is required to keep the door in an open position.

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RADIO Number

Buyer's Guide Section

IN THREE PARTS Part Three

ELECTRIC REFRIGERATION NEWS

Registered U. S. Patent Office.

The business newspaper of the refrigeration industry

ISSUED EVERY TWO WEEKS
VOL. 5, NO. 3, SERIAL NO. 105

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DETROIT, MICHIGAN, OCTOBER 8, 1930

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RADIO, REFRIGERATOR GOOD SALES COMBINATION

Allied Line Helps Even Up Sales Curves

Peak Months of Radio Selling Come During Cold Weather

SCORES of dealers who have actually tried the combination attest the fact that the addition of a line of radios to an electric refrigeration franchise is a god-send to the dealer whose sales fluctuations are troublesome. By virtue of its cold-weather sales peak, its price, and its place in the home, the radio makes an ideal companion for the refrigerator.

Already one of the most popular household specialties on the market, the radio is gaining steadily in public favor. Improvements are being made in reception, tone quality, and appearance. Mass production methods have brought the price of handsome models within the reach of millions.

Dealers who have already taken on both products have discovered that the extra overhead expense caused by the addition of the second line is slight when compared with the gain in profits and organization morale. The same window displays and floor space may be used for both articles. Best of all, the same salesmen can sell each with little additional training.

Head Start

The salesman who has done a good job with electric refrigerators has a head-start toward success with radios. He knows the technique of selling in the home. He knows the story of comfort and happiness and the modern standard of living. He has studied the reactions of prospects who belong to the same general classifications as those who will buy radios.

During the lean winter months, when most refrigeration salesmen find it difficult to earn a fair income, and when many change employers or occupations, those who belong to an organization which merchandises radios as well as refrigerators will find themselves right in the middle of a hotbed of selling activity. When refrigeration sales drop off, radio comes into its own.

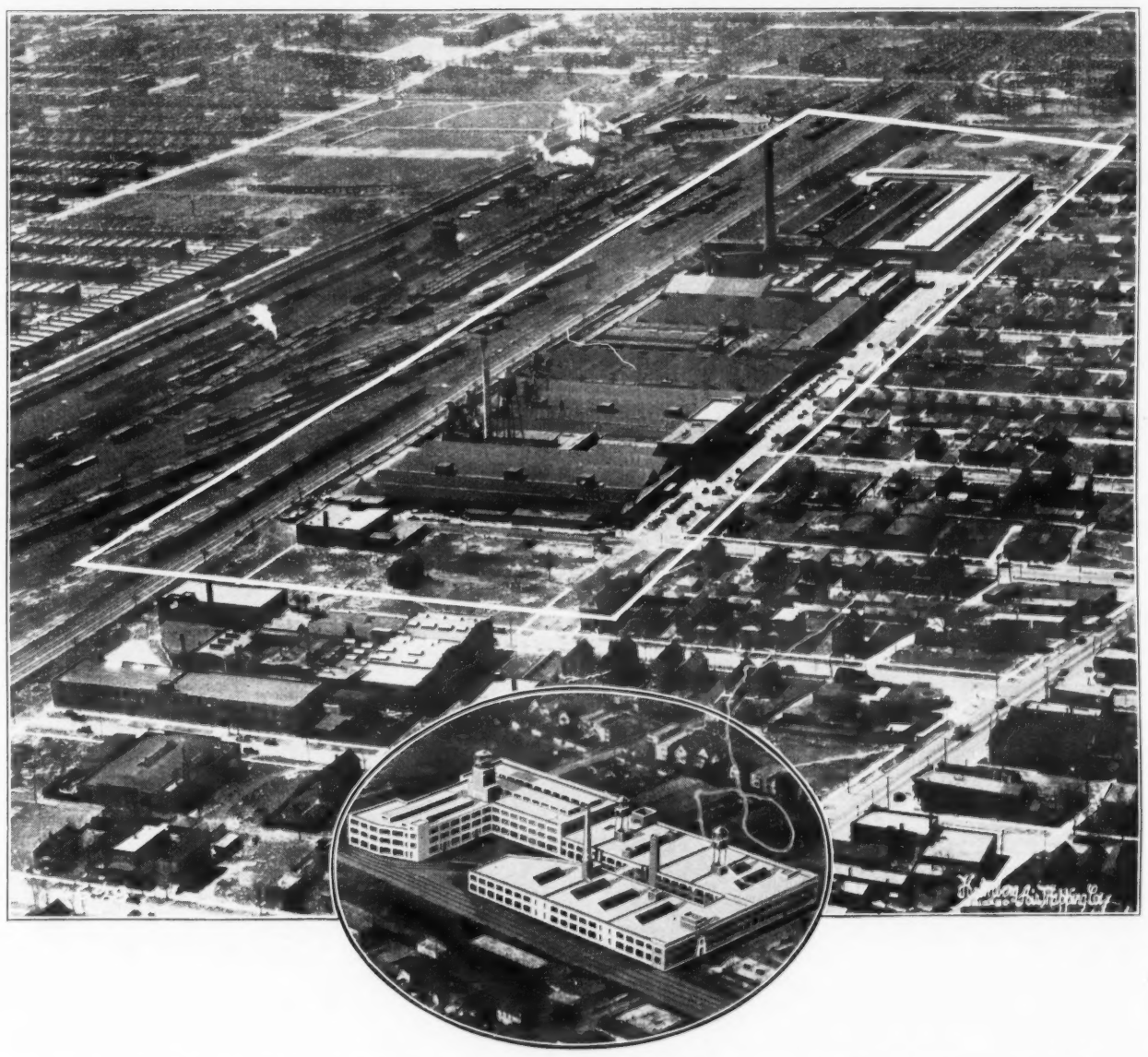
Variety of Models

Formerly the radio dealer who wanted to reach several price levels had to stock a number of different makes. Nowadays one line is apt to contain models which range in price from the lowest-bidder class to the luxury groups. Midget models, in keeping with the trend of the times toward smaller and cheaper products, have made standard makes available to anybody who has a few dollars for a down payment.

Every prospect for an electric refrigerator is a prospect for a radio. The replacement market for the latter article is going strong at present, for line production of console models has rendered obsolete the box and separate loud

(Concluded on Page 4, Column 3)

Majestic Invests Heavily in the Idea



Mammoth Chicago plants of Grigsby-Grunow Co., in which Majestic radios and refrigerators are made.

Wextark Show Attracts Detroit Throngs

Detroit, Mich.—More radios than Detroit had ever seen before—gathered under one roof—were on display at the Wextark annual radio show conducted here during the week of September 29 to October 4.

Throngs of Detroiters swarmed through the two exhibition floors, surveying the latest model cabinets and hearing the voices of 26 different makes of radios.

Also on exhibit were the new Majestic electric refrigerator and the complete Copeland household line. Electric washing machines, vacuum cleaners, and health lamps completed the formidable array of home equipment.

Features of the show were nightly

(Concluded on Page 4, Column 3)

Crosley Forecasts New Era For Industry

Cincinnati, Ohio.—"The radio industry is entering a new business era in which sanity, straight thinking and sound merchandising and advertising practices will rule those companies which are successful," says Powel Crosley, Jr., president of the Crosley Radio Corp.

"The hectic years of rapid growth, with their curious stunts, ballyhoo, extravagance, waste and foolish business methods which made radio merchandising resemble a street show, are now past," he believes.

"After the fiasco in November, 1929, when, because of over-production of radio merchandise by many manufacturers, much of it had to be liquidated at ridiculous prices, we decided to concentrate our efforts upon the creation and production of a new line, instead of retrenching.

"This new merchandise is now ready, and already we have had a reaction that makes us face the future with great optimism. We believe that business is back to normal and steadily improving. During the past few weeks our pay-roll has been considerably increased and more employes are being added every

(Concluded on Page 6, Column 3)

Ann Arbor Dealer Sells Three Home Devices

Ann Arbor, Mich.—It's a very simple matter to maintain a household appliance business running at top speed all the year 'round, without turning it into a general store, if one may believe the members of the E. J. Claire & Sons organization.

These men sell electric refrigerators in the summer, radios in the winter, and electric washing machines in any season. Thus equipped, the salesmen need never slow down or sigh for "hot" prospects.

Nine years ago E. J. Claire had a small battery shop in Chelsea, a neighboring village. When the first Atwater-Kent radio made its appearance on the market, Mr. Claire secured a dealer

(Concluded on Page 6, Column 3)

Trained Dealers Want Related Products

Specialty Organizations First Class Receiving Set Outlets

RADIO manufacturers who are seeking new and better outlets for their products will find electric refrigeration dealers running to meet them with open arms. Specialty selling organizations of the highest type, these well-trained, spirited, and fast-moving sales forces are eager to find a line of allied merchandise to help straighten out their sales curves.

Electric refrigeration has been one of the recent sensations of the business world. After a slow, painful growth, it rapidly blossomed into an industry which is commanding the respect and attention of the nation.

Intense market cultivation and consistent camping on home doorsteps have enabled these progressive dealers to carry on in spite of the general depression, and to establish new sales volume records during the year.

Lean Winter Months

Successful as they have been, however, these aggressive dealers have been faced with a very definite problem. During the spring and summer their sales reach a high peak, but autumn and winter are all too likely to bring lean months.

Salesmen who are real winners during the months of heavy demand often are forced to turn their efforts toward other means of making a livelihood when the snow begins to fall and the thermometer drops.

Desirous of keeping their organizations intact, of flattening their sales curves, and of building their profits without greatly increasing their overhead expenses, electric refrigeration dealers are in the market for a product which has a sales peak during the colder months, and which will fit comfortably with their present lines of merchandise.

Dovetails Neatly

One of the best answers to this dilemma yet brought forward is the radio. Having a sales peak during the winter months, and a well-defined slump in the summer, the radio seems to dovetail neatly with the electric refrigerator as a companion product which can be merchandised successfully by one organization.

A lengthy parallel can be drawn between the courses of these two specialties. Both had sudden rises to prominence and power in the industrial world. Both go into the home. Both require electricity, and effect, as a result, a hook-up with the public utilities. The price range on the two articles is substantially the same (although the advent of the new midget radio is bringing the latter below the hundred-dollar-and-up class). Consistent and heavy advertising, good display, and trained specialty

(Concluded on Page 4, Column 3)

NEXT ISSUE: METALS

Shifting its appeal from the dealer and distributor to the manufacturer, the next Buyer's Guide section of the NEWS will discuss metals and their relation to the electric refrigeration industry. Metal products which are now used, or might possibly be used, in the making of electric refrigerators will be considered from the angles of preparation for the market, adaptation by the industry, and future possibilities.

Past "pink sections" have considered problems of the dealer. Modern office equipment, with carefully evolved schemes for its integration and efficient manipulation, was presented in the first Buyer's Guide. In the second delivery equipment was portrayed. Electrical advertising was the theme of the third. In the last issue the oil burner field was explored with the idea of showing the dealer how to straighten out his sales curve. Radios are presented in the present section as another solution to the same problem.

Just because attention will be diverted, for the time, to a subject more intimately concerning manufacturers than dealers, the latter need not cease perusing the "pink section." The Metals Number will contain stories and elucidations of the materials which go into a refrigerator that should help the dealer understand his products and sell more of them.

WESTINGHOUSE DEALERS TO GET NEON WINDOW DISPLAYS

New York, N. Y.—Westinghouse Electric & Mfg. Co. has placed an initial order for 1,000 Claude Neon window displays for the new Westinghouse receiving set.

The specially designed unit is 12 inches long and utilizes the Crystalite idea of reflecting the neon light through an etched glass face.

The displays will be distributed among the Westinghouse radio dealers in conjunction with an extensive newspaper campaign.

ENTER PHILCO, ZENITH

That electric refrigerators and radios make an excellent team is proved by the number of manufacturers who are now making both products. Two additions to this group of far-seeing corporations are coming, according to recent reports. The Zenith Radio Corp. of Chicago and Philco of Philadelphia, substantial makers of radios, are planning to enter the electric refrigeration field shortly.

Officials at the Zenith plant admit that experiments with an electric refrigerator have been carried on for some time, but further than that have nothing definite to report. Philco, like Calvin Coolidge before he forsook the White House for the Fourth Estate, is remaining discreetly silent.

Companies already marketing both radios and refrigerators include the General Electric Co., General Motors Corp., Westinghouse Electric and Manufacturing Co., Grigsby-Grunow Co. (Majestic Household Utilities), and Crosley Radio Corp. (now selling a kerosene refrigerator—soon to market an electric refrigerator). Many distributors for other well-known electric refrigerators have added independent radio lines to their merchandise, and report themselves as well satisfied with the results.

Veteran of Radio Industry Tells Its History, Explains

Marconi, Edison DeForest Led Pioneers

By M. W. THOMPSON
Ass't Advertising Director, Grigsby-Grunow Co., Formerly Technical Editor, The Radio Digest

THE history of radio goes way back to 1867-8, when a noted English scientist, Maxwell, proved to his own satisfaction, by mathematics, that such things as radio waves must exist.

He did no more about it, however, and the next important step was not taken until Heinrich Hertz, of Germanly, in the 1880's, showed that when he had a huge spark coil in operation, he could hold a single turn of wire near it and that a spark would jump across the gap in the nearly complete turn or loop of wire.

He also was on the threshold of the discovery of radio, but made no practical use of his work. It remained for Sir Oliver Lodge and Edouard Branly to perfect a more practical device, a "coherer," for the detection of radio waves.

Guglielmo Marconi

Again not a great deal seems to have been done with the young infant, radio, until in 1896 we find Guglielmo Marconi, a youth of 22, demonstrating radio transmission over a distance of about 100 yards for the British postal authorities. In 1897 he increased the distance to four miles, then to eight miles.

Toward the end of 1897 the Marconi methods were adopted by the Italian navy, and, two years later, experiments by the British Admiralty resulted in a general installation of equipment on more than 30 vessels.

It was in 1901 that Marconi, at 27, was able to try and successfully accomplish the experiment that brought him spectacularly before the public. Having completed the construction of a powerful transmitter at Poldhu, England, he came over to St. Johns, in Newfoundland, and there set up his instruments for his attempt at trans-Atlantic communication. On December 12th, with a balloon-raised aerial, his coherer began tapping out the signal "S" as sent out by Marconi's assistant at Poldhu, 1,800 miles away.

Edison, Fleming, DeForest

Early in the 1900's Edison had been experimenting with his electric lamps and had developed one with a hot and cold electrode, which Dr. J. Ambrose Fleming perfected for radio use. On a practical two-electrode vacuum tube rectifier, he was given a patent in November, 1905.

About the same time, Dr. Lee DeForest, a Yale graduate, was working on similar tubes, although his had three electrodes. His patents, granted from 1906 to 1908, mark the completion of what is probably the greatest single step forward in radio's history. The three-electrode tube made possible consistent long-distance telegraphy and practical radio telephony as we know it in broadcasting.

Caruso Broadcasts

Dr. DeForest had radio telephony at a fairly practical stage as far back as 1908. Dewey's famous fleet was, in part, equipped with DeForest "radiophones" toward the end of that year.

Probably one of the greatest broadcasts of all time was heard by not more than 100 amateur and ship operators, when, in the season of 1908-09, DeForest broadcast a series of Caruso solos from the Metropolitan Opera House.

We move along now to the last few months of 1915, when we find Mr. John J. Carty, of the Bell system, completing an amazing hook-up. Theodore Vail, president of that system, talked into a phone on his desk, which was connected to a huge assemblage of tubes at Arlington, near Washington, D. C. From there his voice flashed into space and to Mare Island, California. Although not intended for them, his talk was heard well in Pahama and Hawaii.

Air Service Outfits

The years of the Great War, and particularly 1917-18, saw great strides in the development of radio telephony, and the writer well recalls the thrill he got when first introduced to Air Service outfits SCR-67 and SCR-68, which were tube transmitter-receivers that made plane-to-ground and plane-to-plane voice communication possible.

Broadcasting as we now know it first appeared in 1920, when station KDKA broadcast presidential election returns. The hundreds who heard the news and music of that broadcast wanted more, and by September of 1921 there were three stations in regular use. By December there were 28, by February of 1922 there were 60, and in December of 1922 there were 576 on the air. The peak was 591, in May of 1923.

In 1904 saw the radio industry with a sales volume of about $100,000; in 1909 it had stretched to approximately $450,000; by 1914 it was something over three-quarters of a million dollars; 1919 found it an $8,000,000 industry; while 1923 was reported as a $50,000,000 year. Last year, 1929, the industry was believed to be worth between $800,000,000 and one billion dollars, in terms of the value to the consumer of its products.

First Radio Show

The first radio show of any importance was that held by the radio amateurs of New York at the Hotel Pennsylvania roof garden in February, 1922, at which time the public so jammed the hotel and display space that the fire and police departments had to take a hand.

This woke up the exhibitors to the fact that the public really wanted to see radio sets, and "Sport" Hermann opened the radio season in the fall of '22 with his October show at the Coliseum in Chicago. This was followed by a show in Boston and another in New York in December.

Circuits went through the crystal detector, regenerative, tuned radio frequency, reflex, and further developments of these stages, from 1922 to 1923, and wound up with the neutralized or balanced circuits (tuned radio frequency) which have been in general use up to this time.

The refinements have been in tubes, power supply, and speakers.

Prior to the advent of the Grigsby-Grunow Co. in June of 1928, there was no mass production of complete console receivers with dynamic speakers of good reproducing qualities. Sets were either high-priced consoles, or low-priced table models, operating cone or horn speakers.

Console Cabinets

Into this "hole" in the market jumped Majestic radio with console cabinets, steel-chassis receivers, "push-pull" amplification, and dynamic-type speakers at prices well below the $200 mark.

Prices of receivers, competitive in size and quality, tumbled sharply, and 1929 found average prices at the $150 mark. Mass production along automobile lines accomplished it.

A B C of Radio

THE start of all broadcasting, whether it be through a single station or a great chain, is in the creation of sound. Some forms of sound are highly complex in their make-up, involving many notes to form a chord, or the many little characteristics of speech by which we recognize voices.

Let us take, as an example, a vocal solo as given by an accomplished tenor or baritone. This for the reason that but a single, almost perfectly pure note is created at a time.

Vocal Chord Vibrations

Our singer is in the studio of a broadcasting station and presenting a selection for his radio audience, whom he cannot see and whose appreciation he can only learn through cards received days later. As the singer pushes air through his vocal chords he causes them to vibrate and, for the sake of simplicity, we will presume that but one vibrates for each single musical note.

Now the note being created is the result of the vocal chord being caused to vibrate at a definite number of times per second. That is how notes are distinguishable; each has a definite rate of vibration of its own, no matter how created. If our singer changes to a different note, he either causes the same chord or another one to vibrate at a different number of times per second. Just as if you hold a rubber band taut across the thumb and forefinger of one hand and pluck it with the other hand and get one note, then let it loosen ever so slightly to get a lower note when plucked again, so the human vocal cords work.

Energy Necessary

Now keep this thought in mind: When you pluck the rubber band, you must put energy into it, even though very little. This energy goes into the rubber when you draw it back and is spent in vibrating. The singer puts energy into pushing his breath past the vocal chords with sufficient force to cause them to vibrate violently, and it is absorbed by that vocal chord used for a given note.

The energy which we have put into it cannot stay there. Where does it go? When it vibrates, it forces the air immediately surrounding it to move also. The air particles are crowded together and some are shoved away slightly. These pass the shove along to others and then return to their original position.

Those that have been shoved pass it on and they also return to where they were before.

What is termed a "movement of energy" in the form of a sound wave has been started. The air itself does not move away but the shove, or ripple, or wave, does. The movement is passed on and on, and the waves occur and follow each other at the same number per second that the vocal chord vibrates.

If a person could direct his or her voice in but one direction only, our singer would have to use only about 1% of the energy which he must employ; 99% of that which he sends out in sound waves is not only absolutely wasted but means must be taken that it will not interfere with the desired 1%.

The singer is aiming only for the comparatively small disc, suspended on a pedestal, which is called a microphone. Through it, the 1% which strikes it, goes out to the great army of listeners. The 99% strikes the walls, ceiling and floor of the studio.

The wave movement in the air particles going into the microphone is now going to be changed in form and into impulses of electrical current. There is no need of going into the construction of the inner mechanism of the "mike." Sufficient to say that three wires going into it, and that by means of batteries we feed it a steady unvarying current of electricity.

Duty of Microphone

It is the microphone's duty to break up this steady current and cause it to flow as a series of impulses occurring at just the number per second of the sound waves the singer originates.

A radio telephone transmitter, as used by the first class broadcasting station of today, is quite an imposing affair.

This high-priced assembly of carefully made apparatus divides itself into two distinct groups, each having a different purpose. Most of us have, by now, heard station XYZ announce that "we are broadcasting on a frequency of 700 kilocycles by order of the Federal Radio Commission."

It is the purpose of one of the two groups of equipment at the sending station to create and send forth a steady stream of radio waves in which 700,000 waves will be sent rippling after one another every second.

Oscillator, Amplifiers

The tubes and their associated equipment which accomplish this are known as the "oscillator" and "power amplifiers."

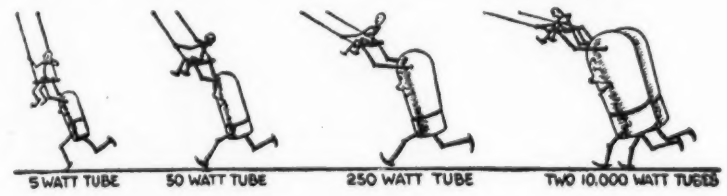


Figure 1

The other part of the apparatus at each station is there to see that the voice, music, or other sounds to be broadcast, are properly and thoroughly placed on the radio waves and so carried to the thousands of waiting receivers.

The process of getting sound so mingled with the radio waves that it will stay there is called "modulating," and the tubes and equipment which do the trick are "modulators."

In ordinary conversation we use the word by saying: "Please modulate your voice," when a friend is talking too loudly. It is into the modulating apparatus that we feed the impulses from the microphone and speech amplifiers.

Small Tube

Taking up now the oscillator and power amplifier, we start things with a tube but little larger than the ordinary type 27, which many fans now use as the first audio tube in their sets. We connect it to coils and other parts in such a way that it now does just the opposite duty that a detector tube does in your receiver.

In your receiver, it is the function of the detector to take in radio frequency currents, which change their direction of travel in the wire from 500,000 to 1,500,000 times a second, and turn out direct current which travels only in one direction.

When we apply the tube as an "oscillator" in our broadcast outfit, we apply direct current to it, and it produces alternating current which starts in one direction and then comes back, anywhere from a half-million, to one and one-half million times, a second. These frequencies of alternation are called radio "frequencies," but they are not as yet radio "waves."

Energy Depicted

Refer now to Figure 1. Here we have a semi-cartoon depicting Energy being given a gentle swing by a small tube, which is rated as a 5-watt tube. Being a little tube, it can reach the bar at the ends of each swing only up to a certain point, but—it has started the swinging. For that reason it is called the "oscillator."

Now, the power amplifiers come into action. To the right of the 5-watt oscillator is shown the first amplifier, a larger tube rated at 50 watts' capacity. This causes the Energy to swing outward and upward yet further, up to a certain point, and then a tube of 250 watts' capacity takes up the job.

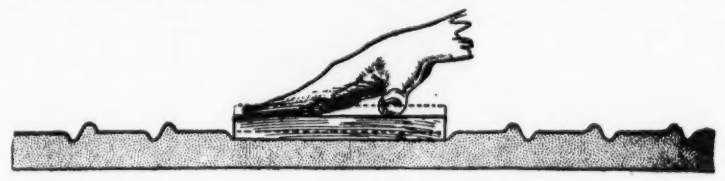


Figure 2

The power now stored up in the swing of Energy has become pretty strong. In 1923 and 1924, a station that finished the series of amplifiers with two 250-watt tubes working together and putting their power into the antenna, was considered a first class station.

Now such tubes are merely a stage of power amplifier and, farthest to the right in Figure 1 we have two huge tubes of 10,000 watts, each working together to give Energy its final pushes. This would give a 20 kilowatt station—yet WGY has used tubes in banks or groups to create a final push of 50,000 watts.

This truly terrific power is then placed across the huge "condenser" formed by the antenna on the one side and the ground on the other. Between these two surfaces there is an electrical pressure set up at each alteration of the current which, seemingly, tends to squeeze a wave motion out into space.

You will recall that wave motion was explained as "energy being passed onward through space as a nudging of particles without the actual particles themselves moving either forward or back." Figure 2 will make this clearer.

Rippling Waves

Suppose we take a large, rubbery sheet of gelatin and place a flat plate of metal near its center. If we now press and release, press and release on this plate, we cause ripples or waves to go out from the plate. We have momentarily created pressure between our top and bottom plates.

While you cannot see it, a pressure of an electrical nature has been created between the antenna and ground and a steady stream of waves is radiated. Because it carries the program to its thousands of destinations, you frequently see this referred to as the "carrier wave."

Having created this wave, we must now get the program impressed on it. As mentioned before, the modulation equipment is provided to accomplish this.

Heising Method

In our sample chain of power amplifiers we ended up with two 10,000-watt tubes working together. To place music on the wave they throw into the aerial circuit, we must have two more 10,000-watters working with them.

The system of modulating universally used is called the Heising method, because first devised by an American inventor of that name. It has proven far superior to anything else for this purpose.

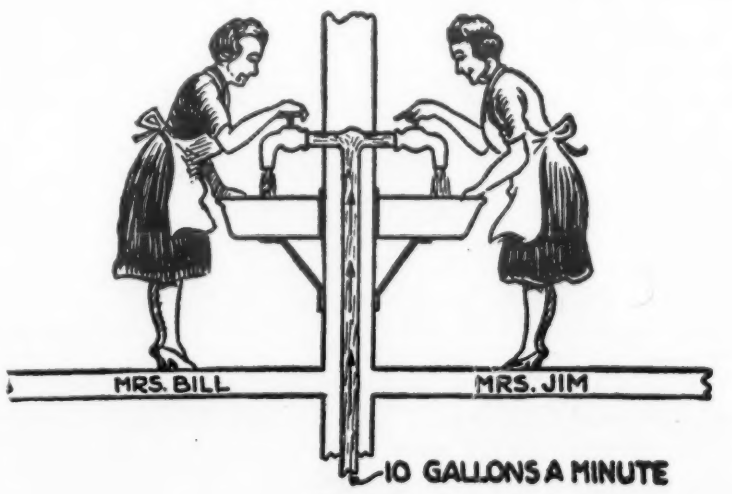


Figure 3

Figure 3 illustrates how it is done. Let Mrs. Bill at the left represent our first-mentioned two large tubes, which are the last stage of power amplification. We will say that Mrs. Jim at the right is our pair of modulator tubes and of equal size.

The power supply which is common to both pairs of tubes is here represented by the water pipe coming up through the wall and going to the faucet of both Mrs. Bill and Mrs. Jim. There is a steady, unvarying flow to the water of 10 gallons a minute, while, in our radio parallel, there is 5,000 volts pressure and 8 amperes possible.

If Mrs. Bill and Mrs. Jim both have their faucets about half open, each gets, we'll say, five gallons a minute. But, if Mrs. Jim (the modulators) opens hers a little wider, she gets six and Mrs. Bill gets only four. This latter lady calls out that she needs a little more, and Mrs. Jim turns her faucet back and cuts her flow of water to three gallons. Then Mrs. Bill (the big amplifier tubes) gets seven.

Now, in our radio transmitter, we cause the amount of current (amperes) to vary in our modulator tubes by talking or playing and, since the amount supplied is eight, the current possible to the amplifier tubes will vary above and below four.

Modulator Tubes

If the Mrs. Jim modulator tubes take 4¼, the other pair get but 3¾, while if they draw but 3⅝ amperes, the Mrs. Bill power tubes can have 4⅜—and take it. So it goes.

As we talk or sing into the microphone we cause little impulses to tear through the modulator tubes so that they draw more or less current and permit the powerful amplifier team to get varying amounts.

The result is pictured in Figure 4. Here we have the steady stream of waves being created by the big amplifier tubes racing from left to right. At the modulation point it is as though we held a shaper which we can raise and lower to hit every wave.

Shaper Changes Rapidly

After it is past the modulator, every wave carries the impression of the shaper. The shaper, in its radio form, changes rapidly with every letter spoken and note that is sung.

In this article we have taken up the generation of radio waves by banks of large tubes, controlled as to the length of the wave generated by very small ones, and on whose wave we impressed voice or music by means of another bank of tubes called "modulators." Which brings us to the point where the waves of one station are hurled off into space to bring entertainment to hundreds of thousands—even millions—of people.

Where do they go? What finally becomes of them? How are they propagated through space? What are they, in fact? That is something that you know almost as much about as the most learned scientist.

Surprising Ignorance

Considering the tremendous use to which we put these radio waves every day, the vast sums of money spent for radio sets and accessories every year, and the amount paid for advertising carried on these waves, our ignorance as to the radio wave itself is indeed surprising.

We have learned a good deal as to the operation of apparatus for sending out radio waves, and we have on the market some really wonderful equipment with which anyone can listen in, but as to what happens to radio energy in the interval between the transmitting antenna and reception on your aerial, practically nothing is known.

During the past 20 years or so, engineers have, naturally, accumulated quite a fund of knowledge on how to handle these waves, and much data has been

Fundamental Principles of Receiving, Broadcasting

gathered, which, in turn, has given rise to many theories on radio waves—some very sound and plausible, others not so good and later proven impossible in the light of new discoveries.

Waves Get Weaker

We know, first of all, that radio waves get weaker as they get away from the station transmitting them. The doughnut, with which we are all familiar, makes a good item on which to show why this is true.

The doughnut is, we'll say, three inches across the outside. The thickness of the ring at any point is, perhaps, one inch (see Figure 5). Using the same amount of material, imagine that we can increase the total outside diameter to six inches. The thickness of our ring will now have to be considerably less than one inch. Still using the same amount of material, we increase the diameter to 20 inches. The thickness of our ring then will be pretty small—just about the size of a heavy piece of string.

Just so with radio energy. When first started traveling in all directions from the broadcasting antenna and ground system, it is strong; there may be enough, in the case of large stations, to light a large building. As this energy moves outward, it must be spread around a larger and larger circle, and the amount at any one point gets smaller and smaller.

Figure 4

By the time a wave has passed half way around the earth it is in the form of a ring 25,000 miles around. It would seem at first thought that all this energy would come together at a point on the opposite side of the globe and be very powerful there.

Mystery

This does not occur, however, and what happens to the waves is still a mystery. Presumably, much of the radiated energy does not follow the curvature of the earth's surface, but goes off at a tangent. Presumably, also, much of it is absorbed by certain formations in the earth which it goes over or through.

There are many who believe it has qualities similar to the magnetism around a horseshoe magnet with which we've all played as youngsters, in which case our radio wave would be weakened by fields of iron ore, steel buildings, and the field and poles of the earth.

Others contend that its properties are those of a condenser, and a condenser need consist only of two metal plates separated ever so slightly and to which we cannect wires from a source of current.

If this contention is correct, our radio wave would lose energy passing over forests and jungles, where great masses of damp leaves offer millions of leakage paths for radio energy, and all conductors that stick up in the air would weaken the wave.

There is much data to show that a radio wave is composed of characteristics of both types, hence almost anything it passes over or through would weaken it. So far there is nothing to prove that it does not go on forever.

It is most interesting to stop and consider that right at this moment you have the waves of American "jazz," a talk on English politics, a South American speech in Spanish, and a Chinese love song passing through you (see Figure 6). If your body were but a detector, what a riot of music and languages you'd turn out to be!

Right Through Us

Practically all the news of all the stations on earth are passing through you—unnoticed, unseen, unheard and unfelt. Since it has been practically proved that we ourselves are vibrations, and since we know that radio waves are vibrations, it seems strange that we do not respond in some way to these thousands and thousands of waves going through us all the time.

We have, in connection with radio reception, the undesirable phenomena known as "static." The source of some of it is known, since some of it is man-made, but the cause and source of a great deal of static is still a mystery.

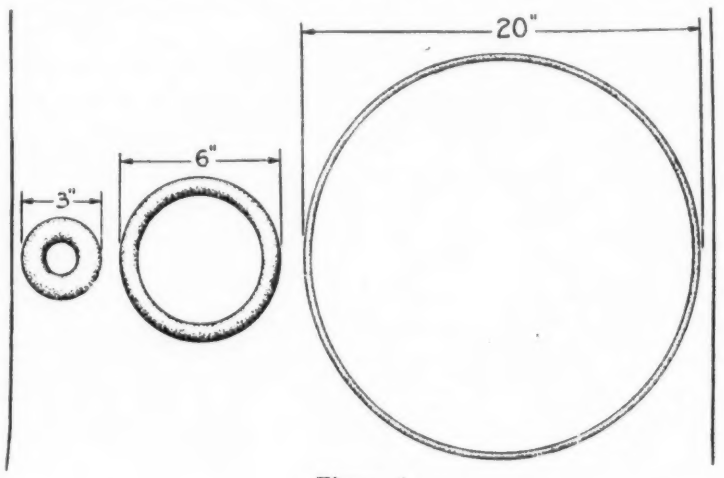


Figure 5

Static is that irregular crackling or series of intermittent crashes that mar long distance reception, but which is not particularly noticeable on local reception.

Man-Made Static

Man-made static is the result of defective or poorly designed electrical equipment of practically every type made. We design our electrical equipment to be as efficient as possible, to use every bit of electrical energy generated except that necessary to overcome the resistance of the wires carrying it.

The question is invariably asked, "Well, cannot someone invent a way of getting rid of static?" Thousands of "someones" are seeking the solution all the time, because a fortune, both immediate and enormous, awaits the man who finds it.

The difficulty can best be shown by considering a machine gun and a shotgun. Let us say that we have three machine guns, each shooting a steady stream of bullets in the same direction but about two feet apart. Our target is movable and, if we do not wish to have it in the stream of gun number one, we move it into the stream of number two or number three. We can have the stream of bullets from any one of the three guns going through our target.

If, just above the center gun, there is someone firing a shotgun every few minutes, slugs from nearly every shell are going to hit our target, regardless of where we place it. We've got to keep within a limited area to be in the stream of one of the machine guns, and so cannot avoid the scattering shot of the shotgun (see Figure 7).

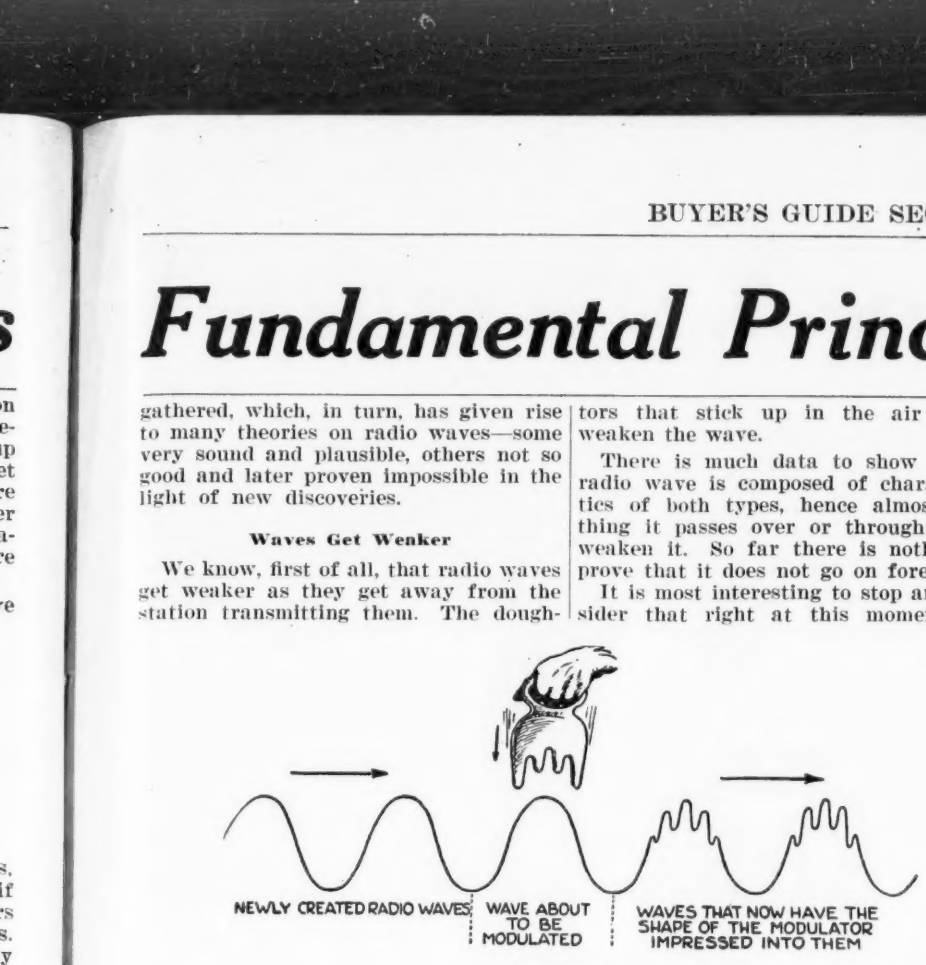


Figure 6

Machine Guns

Getting back to radio, the machine guns are our broadcast stations, our receiver is the target, and static is the shotgun. We can move our receiver-target into any stream of wave-bullets we wish, but cannot lose the scattering volleys of static. For static knows no wavelength. It doesn't occur in a steady stream, like machine gun bullets; there are waves, but on many wave lengths, and one cannot tune it out.

Static is found on the lowest of low wave lengths used by the amateurs, on the long waves of transoceanic press and message service, and on everything in between.

Like the shotgun slugs, static has a limited range. That is why you do not get all the static generated all over the world. Waves of static, being radio in character, die out, and with a given amount of energy at the start, do not carry as far as does a pure broadcast wave of the same initial energy. That is most fortunate.

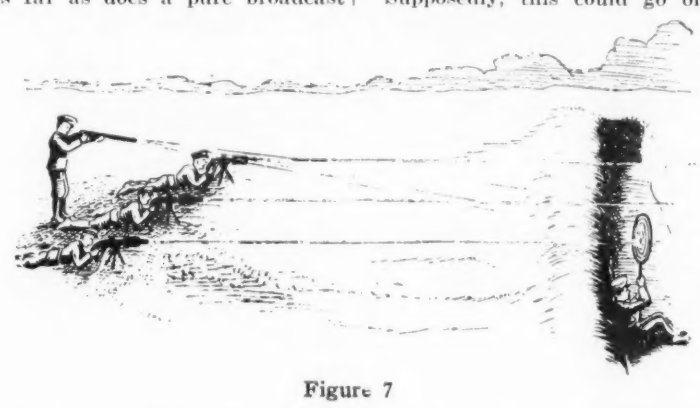


Figure 7

That is why, when you have a powerful station coming in, and you can cut down your sensitivity, you get very little static. The broadcast wave is coming in so strong that you can cut down the range over which you receive energy of a given starting value, and hence eliminate all the static not started from very close at hand.

We now take up reception in a broadcast receiver—and some of the whys connected with a receiving set. Our problem is: first, to pick up and strengthen the radio and audio energy; second, to sort out the music and voice part, and third, to further strengthen the electrical impulses which we will then have at the audible frequencies just mentioned.

Since about 85 per cent of the receivers in use are of the type known as "tuned radio frequency," we will consider reception by such an outfit.

Aerial

We must, first of all, have an aerial and ground. The aerial can be either an outside wire running up the side of the building and over part of the roof, or an inside wire running around the picture moulding or baseboard or in the attic.

The ground can be a wire attached to the water pipe, one running down to the water in a well, or a wire connected to a long metal pole driven into the earth.

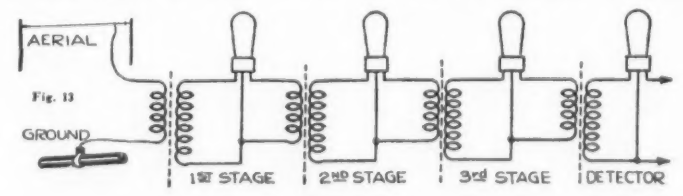


Figure 8

What we are trying to do is create a length of wire above the ground possessing what we call "inductance," and a space between two conductors (antenna and ground) possessing a characteristic which we call "capacity." As a stream of energy, radio impulses, passes through this space and cuts across our wire having inductance value, part of the energy in each ripple changes its form and becomes electricity in the wire.

Oscillating Currents

It is in the circuit composed of aerial and ground wires that we create what are called "oscillating electrical currents," which go one way, reverse, and go to the opposite way the same number of times per second that our ripples of energy occurred in the air.

It is said to be at "radio frequencies," though no longer in the form of radio waves. This energy, still carrying the voice and music, is to be amplified by one or more of the glass bulbs which we call "tubes."

Each tube has associated with it some other parts which are necessary to getting our energy into and out of the tube properly, so we speak of each tube and these parts as a "stage"—a stage of amplification. Amplification means to "add to" and, in this case, we mean to add energy in the form of electrical power to each swing of the current in our circuits.

Delicate Operation

When you consider that these swings occur at from 550,000 to 1,500,000 times per second, it is evident that this adding of strength is a very delicate operation. To date, nothing has been discovered that will do this, other than a tube, the invention of Dr. Lee DeForest, who called it the "audion" when he first brought it out.

It is possible to have from one to four of these stages or tubes amplifying these very high frequency currents in a set that can be made and sold commercially (see Figure 8).

More stages are possible in the laboratory, but not over the counter. Our first stage builds up the signal to, let us say, nine times its original strength. The signal is then fed to the second stage, which amplifies it nine times more. It is now eighty-one times more powerful than when it came in on our aerial and ground. A third stage will multiply its energy nine times further, so that it is 729 times its original value.

Supposedly, this could go on indefinitely, but when more stages are added for amplifying at radio frequencies, the whole complicated system is apt to get beyond control.

If four of these stages are to be used it is better practice to cut the amplification per stage to seven, which, after going through four tubes, would show a resultant gain of 2,401.

Amplification Stages

What makes all this confusing to the beginner is the fact that one may find a single dial on a seven-tube outfit, and three dials on a five-tube outfit. It must be explained that each of these stages of amplification at radio frequencies, and the tube used to separate the music from the radio wave, must have a device that is turned or "tuned" to adjust that tube to the desired program.

Each stage can have an individual dial, or they can all be moved simultaneously by one. Yet, the first can have one dial and the following two can have a dial, or the following three, depending on the design of the set.

From the standpoint of "efficiency" it is better to have separate dials for each of the tubes mentioned above, but from the viewpoint of convenience, simplicity and ease of handling, one dial for all is to be preferred.

Radio sets can now be manufactured with such precision that it is feasible to put all of these devices on a mechanism to be tuned by one dial and get very nearly 100 per cent possible results.

Regardless of whether we strengthened the signal to 81,729 or 2,400 times its incoming strength, it is then fed to a tube which, because of the duty it performs, we call the "detector."

It can be just the same type as its predecessors and interchangeable with them, or it may be a special tube that performs this duty better; but a detector is expected to separate the music and voices from the radio frequency currents which brought them to us. As stated, its input apparatus must have a device for tuning it to the preferred program.

To attempt to explain the exact manner by which a detector performs this delicate job is outside the scope of this article, but the net result is that the radio frequencies disappear and the program appears in the output circuits of this tube as impulses of electrical energy. These all travel in the same direction, that is, they do not alternate their direction of travel as the radio currents did. For that reason they are now in a form which we call "direct current."

It has been stated before in this article that audible frequencies are those occurring or vibrating at from about 30 to several thousand each second. Our direct current impulses follow each other through the circuits which we now add, at these rates.

A very low note is in the form of, say, 40 or 50 impulses each second, while a high note may be 4,000 or 5,000.

Audio Frequency

The stages which follow the detector are called audio frequency stages or tubes because they handle energy only at these frequencies. There may be either two or three of these tubes, and here we can amplify the energy considerably more per stage than we could before. 12 or 15 being not uncommon. Thus with two well-designed stages at a gain of 15 per stage we can get a further amplification of 225, or a total gain from the aerial circuit of 164,000.

The point is bound to come up in the reader's mind as to where the energy comes from that is added. One cannot create energy from nothing.

A radio set must have "A," "B" and "C" current, and it is the purpose of the "A" battery or "A" current to light the tubes. The "B" current is applied to a radio set to furnish the energy which amplifies the program to pleasant loud speaker proportions.

From it, each of the amplifier tubes draws a minute quantity of energy which adds to the vibrations passing through and in exact rhythm or swing with those vibrations. The result in the loud speaker is impulses of electrical energy of considerable strength.

Air Vibrations

One may wonder why such strength is necessary or desirable. Sound is the result of vibrations of the air striking our ear drums, the pitch of the note being determined by the number of these vibrations per second. This is actual movement of the air, in the case of sound, and not just "nudgings" of infinitesimal particles, as was the case with radio waves.

To move air to create a volume of sound such as that created by an orchestra or grand piano, requires considerable energy. The transition of energy from direct current impulses, as they occur in the last tube of our radio set, to sound waves, is accomplished by the speaker.

Winged Wires

Consider the enormity of the feat being accomplished, the vastness of the territory man now covers with his music. Music which millions would never hear, and never learn to appreciate, were it not for this creation of scientific and commercial enterprise—the radio.

Such an accomplishment was beyond the conception of even the mightiest of the ancients. Yet today this instantaneous transmission of music and the human voice is accepted as commonplace, and many wonder why science cannot hurry the perfection of compact little boxes that will reproduce, for the eye, these important events, while they are transpiring; and broadcast from portable "radio cameras" at the scene, and through powerful distributors.

Beyond Comprehension

Many times you must have wondered how all this was done. How the human voice could be changed to travel silently and at the speed of light over fine threads, could lose even the tangible path of the threads and leap out into space, silently to spread out over cities and towns, over forests and impassable mountains, to again be a human voice, to which any and all may listen at the touch of a finger.

Surely it must sometimes give you a tingle along the spine to be able to control one of the most complex mechanisms yet devised by science, a mechanism that sifts out the complete music of an orchestra from the scurrying radio wave and gives it to you with every delicate touch of the original rendition.

The task of the translator is not easy; each of the dozens of operations, and the many forms into which energy is changed, must be presented with a parallel feature of everyday life with which the average hustling American is familiar.

How Do They Do It?

If you are a manufacturer of machine tools, have you ever tried to explain to your doctor just how your automatic turret lathe works—without a machine to demonstrate on?

Or, if you happen to be a seasoned manipulator in Wall or La Salle Streets, would you care to explain such things as margins, selling short, class A and class B, call money and the technicalities of a corner to a professor of chemistry or zoology?

In this article it is hoped that a means has been found to cover angles of broadcasting in such a way that "the doctor, the baker, and the candlestick maker," also the machine tool manufacturer and the financial wizard, can get the whole magnificent picture clearly in mind and have full appreciation of what is happening in the vast reaches of the sky over their heads every night.

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The Giants Find An Answer

SOME of the most powerful corporations in the world have recognized the essential relationship between electric refrigeration and the radio. So sure are they of the sound nature of this relationship that they are investing millions of dollars to develop this pair of lusty young industrial prodigies, and train them to work in double harness.

The movement is coming from both directions, and coming fast. Within recent weeks General Motors, General Electric, and Westinghouse have announced radios. The Grigsby-Grunow Co., as important in the radio industry as the above-mentioned triad is in refrigeration, has just brought out its Majestic refrigerator. Crosley, Zenith, and Philco, also leaders in the radio business, are planning to follow suit.

Justification for the movement can be found in the fact that one of the biggest problems of both refrigeration and radio selling is the sales peak. Most radios are purchased in autumn and winter. Refrigerators are sold chiefly in spring and summer. Both industries have been seeking allied lines which might help tide them over the low points in their sales curves, and keep their organizations swinging along at a good gait throughout the year. Electric clocks, washing machines, vacuum cleaners, health lamps, ventilators, and oil burners have all been suggested and tried. The radio-refrigerator combination, however, has been the solution arrived at by titans in each industry.

Until comparatively recent times the refrigeration industry has pursued a course of strict independence and exclusive dealerships. Undoubtedly this policy has been shrewd and prudent, for the industry has gained a solid footing thereby. But sales managers have been learning that seasonal fluctuations deprive even star salesmen of a satisfactory all-year income, and cause a costly turnover of men. Rumblings of a junction between the two youthful but mighty industries, intended to remove the troublesome peak-and-valley obstacles, became audible in the summer of 1929, when it was reported that the Grigsby-Grunow Co. had decided to make an electric refrigerator. A year later, following closely the disintegration of the gigantic radio combination of General Motors, General Electric, Westinghouse, and RCA, the first three of these organizations announced their own radios. The union of these two highly popular specialties thus became an actuality.

Enthusiasm for the radio-refrigerator sales combination has spread outward from the manufacturer to the dealer with considerable rapidity during the past few months. Majestic dealers have been rampant with impatience to get the new "mighty monarch of the Arctic" into their stores. Other radio dealers have become infected with the idea, and have taken on refrigeration lines in order to compete with the Majestic men.

Although the General Motors and General Electric radios are to be distributed through separate outlets, indications point toward tie-up arrangements for dealers in each organization. Kelvinator sales branches, located in northern areas where sharp sales peaks are particularly noticeable, are experimenting with two radio lines. All over the country refrigeration dealers are considering the advisability of taking on a first-class radio franchise.

After several years of frantic shifting and gesticulation, radical changes in models, and meteoric appearances and disappearances of new-born manufacturers, the radio industry seems to be settling down to a sane and sound period of thorough merchandising. Models are becoming standardized—although the advent of the new midget types is noteworthy and significant of a modern trend—and selling practices are improving. The old-time radio dealer who handled a dozen makes at once and sold pianos, mattresses, overstuffed furniture, phonograph records, rugs, and did embalming as well, has abdicated in favor of the specialty selling organization which knows how to concentrate, how to advertise, and how to ring doorbells until somebody answers.

In spite of its turbulent history, the radio has become one of the home equipment world's best sellers within a few short years. Eight years ago 60,000 homes had radios. Now it is estimated that ten million have been installed. And the market is just getting ripe, we are told. The electric refrigerator, too, has been riding on a high crest of public favor. Inasmuch as the two most popular specialties for the home have opposing sales peaks, and since, despite their nation-wide acceptance, the saturation point for each is not even in sight, the alert dealer who sells both products is likely to find himself in an enviable position during the coming years.

Refrigerator Dealer Excellent Outlet For Radio

(*Concluded from Page 1, Column 5*)

salesmanship are required for a satisfactory turnover of each product.

Already equipped to do a thorough job with electric refrigerators, dealers in this line of merchandise can add radios with very little increase in overhead or inconvenience to their staffs. Strenuous competition has taught them sound methods of advertising, display, selling, and service.

Organizations which have already tried the combination have found that the same salesmen can sell both lines, if properly educated in sales and service schools, without difficulty or conflict. Thus a good man can earn a lucrative income all the year round.

Moreover, the refrigeration dealer is armed with a ready-made prospect list. The same families which buy electric refrigerators to protect their food supply are also potential purchasers of the home entertainment supplied by the radio. A dealer who has placed an electric refrigerator in a home has a "preferred entree" there, and will find the sale of a second home appliance considerably facilitated by the satisfaction derived from the first.

To the radio sales manager who is anxious to increase his outlets, expand his territory coverage, or replace ineffectual dealers with go-getters, the refrigeration industry presents several thousand live-wires who know how to sell, and who are anxious to acquire an allied line of merchandise with an opposing sales peak, a high degree of public acceptance, and a reasonable margin of profit.

Wextark Show Interests Many Detroiters

(*Concluded from Page 1, Column 2*)

broadcasts from the second floor exhibition room. Harry Kipke, youthful University of Michigan football coach, was interviewed by "Bud" Shaver, sports editor of the *Detroit Times*, before the microphone from the Wextark auditorium Thursday night, October 2. Radio and vaudeville singers and musicians provided the entertainment on other nights.

An Essex town sedan was offered to the writer of the best slogan for the Wextark store. Slogan suggestions were turned in on cards which bore the name and address of the contestant, together with information on the latter's radio (if any). Thus the Wextark store was provided with a new set of prospect cards.

More than enough salesmen to go around were on hand to tell all visitors everything that could be told about radios, electric refrigerators, and the other appliances on display.

The big Wextark sales organization is now combing the city to follow up prospects discovered during the show, and sell them radios, electric refrigeration, or both.

"A big show like this creates enough interest to keep our salesmen going for months," declares W. J. Brenner, manager of the Detroit Wextark show. "We make a big splash for a week, and the momentum carries us on for a long time. It's well worth all the time and trouble.

"The addition of electric refrigerators to our lines of radios is a recent experiment. From all indications, we think it will be a real help. Most of our salesmen still specialize on radios, but we believe it won't be long until they'll all absorb the necessary information and be all set to earn real money next summer—instead of accepting the summer slump in their earnings as inevitable."

Related Line Evens Up Sales Curve

(*Concluded from Page 1, Column 1*)

speaker types which are found in so many homes today. Improvements in selectivity and tone clarity are also making the replacement business good.

Homes a-plenty which do not have a radio are waiting for the right salesman to walk in with an order blank and a convincing argument. In either case an electric refrigerator dealer who has satisfied a customer with his product meets considerably lessened sales resistance when he approaches with another household specialty.

The progressive dealer who merchandises both radios and refrigerators not only keeps his sales force intact and builds his profits, but he becomes a community asset as a dealer in the "Three H's" which form the main goals of the American people—Health, Home and Happiness. The electric refrigerator protects the health of those in the home, while the radio ushers happiness into the home by bringing it the best of the world's entertainment.

Off Duty in Chicago

By GEORGE F. TAUBENECK

Chicago. To Mr. Average Citizen that name is immediately associated with murders, gang warfare, tear gas bombs, riot squads, machine guns, beer barons, rum runners, poison hooch, and mercenary policemen.

The stockyards, the old World's Fair, and the one to come in 1933, the lake, railroads, industries, and commerce—all of which formerly distinguished the Windy City—are now things of the buried and forgotten past in the mind of a nation.

To the Chicago denizen this attitude is amazing. He is aware, because he has read it in the newspapers even as you and I, that racketeering does exist. He has heard of beer barons, and possibly has had occasional contact with representatives of the fraternity. He peruses accounts of the doings of the gangs.

A Chicago citizen who has actually heard the patter of machine-gun bullets, however, or who has ever had more than a reading acquaintance with a gangster is as rare as a woman who has never worn silk hose.

Visitors who enter the city mortally nervous because they were unable to procure bullet-proof vests, are as surprised as native New Yorkers who fail to find feathered Indians on horseback roaming the territory west of the Alleghenies.

All is peaceful. There isn't a gun in sight. Droves of hurried pedestrians swing briskly down the walks, flocks of automobiles sweep up and down the streets, and business moves on at a double-quick tempo. Everybody is hurrying through the day so that the evening can be devoted to play. It's a great place for amusement.

Radio broadcasting stations, of which there are so many that the waiting line forms on the right and those on the inside must yield their places at short intervals, furnish the only clew—other than the newspapers—to the activities of the underworld, if any.

Right smack in the middle of Amos 'n Andy, or some lilting dance music, a gong will ring and a heavy train-caller's voice will intone: "Squad cars report immediately to 2800 Diversey. Apartment robbed." And then the broadcast continues.

The trick works. Cruising police cars equipped with radios pick up the message and often are quick enough to apprehend the criminals. Tales are told, too, of crooks hearing the warning over radios of their own, and making quick getaways.

Whatever the results, it is generally annoying to be sitting safely at home, a thousand miles distant, and have a petty larceny disrupt a World's Series broadcast, or a Beethoven symphony.

Nevertheless, the whole country depends upon Chicago for its radio entertainment, if one may judge from the floods of telegrams from all points of the nation which pour in to prominent stations nightly.

Certain it is that the Corn Belt listens to Chicago's myriad voices. There simply isn't room on the dial for other stations.

Almost uniformly Chicago radio programs are of high grade. Money flows into amusement spots there like milk and honey in the Biblical land of Canaan. As a result, first-rank bands and entertainers are to be found in almost every block.

Rivalry for public favor is keen among these interpreters of the American rhythm, and no hotel or restaurant is complete without at least one broadcasting band.

Apparently the Middle Western radio public wants little else but modern dance music, for that comprises most of the programs.

Oddly enough, the orchestra which still commands the greatest following is the outfit which first made jazz broadcasts popular: Coon-Sanders Nighthawks.

'Way back in the early days of radio, Joe Sanders, Carleton Coon, and their Kansas City Nighthawks had the whole country sitting up until midnight to hear them play "St. Louis Blues."

The nation is still doing it, albeit they have moved to Chicago, attained mature dignity, and adopted earlier hours.

Entertainers flash in and out of the radio public eye like movie stars. Other bands—notably Guy Lombardo, Ted Weems, and Fred Waring—have at times seized upon Chicago's dancing heart. But Coon-Sanders orchestra, like Britannia, still rules the waves. Odd, in America.

Perhaps Chicago plays so hard because it works so fast. One scarcely sets foot on one of its streets without being caught up in the hurricane of action and movement. Apparently there is a million dollars for everyone just a little farther down the street. Office work moves at the same speed—or at least an outsider gets that impression.

Too, everyone seems to dress as if they were "going out" that night and would not have time to go home and change clothes. It's an extremely dressy city.

Light, flashy, sport clothes prevail among the men. The women all run to a type—a trim, tailored, flashing combination of models by Helena Rubenstein and W. T. Benda.

No longer do these girls care to be pretty. Smartness is the goal. Swift, straight, sure, sharp, and silhouetted are the lines, in marked contrast to the curves and waves and fluffy ruffles of the femininity of yesteryear.

So dark and severe are their clothes and makeup that even the pronounced blondes seem brunettes at first glance—if hatted. The general effect is not so unattractive as it may sound to the admirer of feminine pulchritude.

It's all in perfect harmony with the new spirit of side-by-side-with-man womanhood, whatever that is, and is as much a part of the age as Hack Wilson, mass production, and mammoth marbles (miniature golf).

Self-conscious about its speed, its strenuous working days, and its gay nights, Chicago is taking to this culture business like hinterland women's clubs, with considerably better results, however.

Book shops are becoming almost as common as clothes shops. Good music and drama are abundant. Modernistic art in new buildings and decorations vies with the softness of old oil paintings, imported etchings, and oriental rugs. Night schools are overflowing.

On the streets one hears conversational patches concerning Galsworthy, Tolstoi, Pasteur, and Rodin, almost as often as one gets whiffs of the boss, Aunt Mamie, Rudy Vallee, and the current boy-friend.

And, of course, there's Michigan avenue. Pride of every Chicagoan. A profoundly impressive street. If one came to Chicago and saw nothing else but this majestic thoroughfare, one would believe it to be the most beautiful city in the world.

The illusion is spoiled, however, one block west.

Sages predict that more of the city will become infected with Michigan avenue's grandeur. In which case Chicago may outlive its reputation as the City of Mars, and turn to Venus and Apollo for inspiration.

As a postscript to this set of roving observations on the metropolis of the middle West, we'd like to record a conversation we had once with a Chicago policeman, in re the much cussed and discussed crime situation.

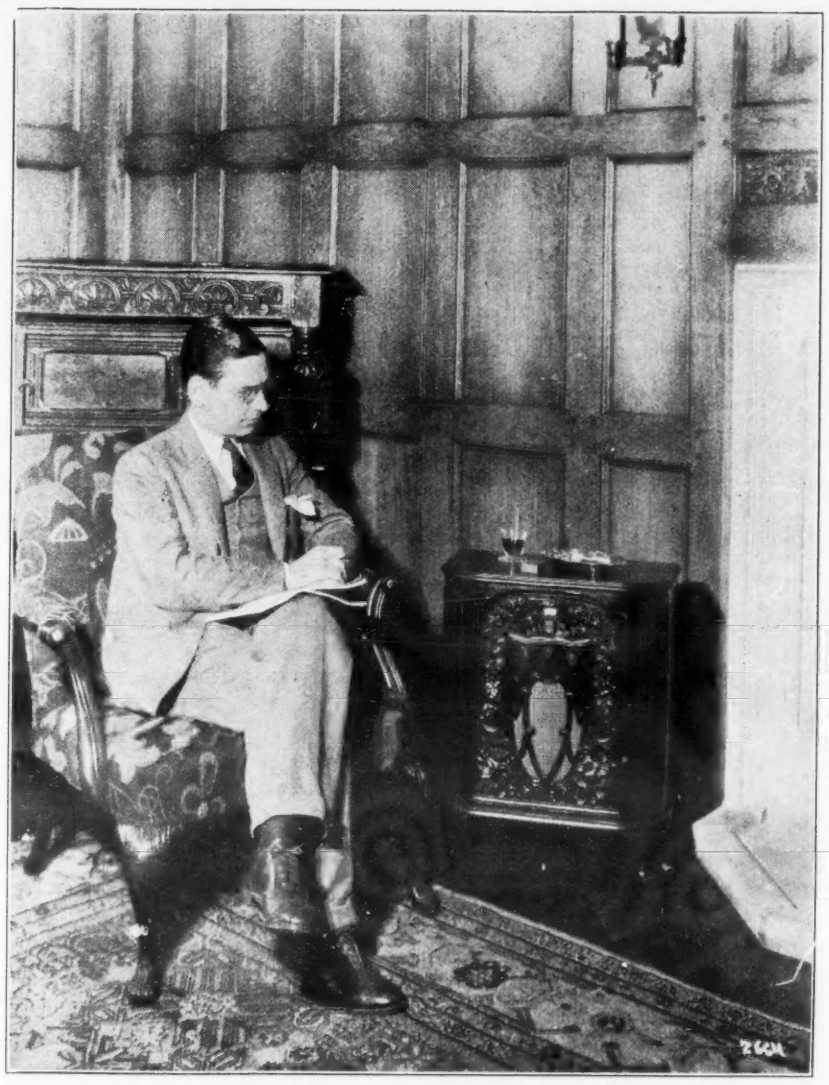
Some six weeks ago we were riding a night motorbus out of Chicago. The ultimate destination of this vehicle was New Orleans, and our seatmate was going all the way. On his vacation, he said.

After an hour or more of relaxation and quiet small talk, he confessed he was a Chicago cop. A bit of probing about the then recent shakeup in the Windy City police force elicited the information that within six hours after he had been transferred to a new district, bootleggers had made the necessary "arrangements" and business went on as usual.

"Why shouldn't I take what I can get?" he argued. "If I don't somebody else will. And if I refuse to play the game, I'm liable to go for a ride. Even when you do arrest somebody, he can go free if he gets to the judge in time. What's the use?"

You can believe that little tale or not, gentlemen; but like the fellow who was hanging to a fourteenth floor windowledge, this is my story and I'm going to stick to it.

RADIO BRINGS GRIDIRON BATTLES TO YOUR HOME



Invigorating autumn weather makes all sports fans think of football. The man pictured above has been enjoying an ice-cube-cooled drink in the privacy of his home while listening to famous Ted Husing (center) broadcast an important game. Again the radio and the electric refrigerator team up well to help the modern man enjoy life!

Fans Listen In As King Football Ascends His Throne

Each year more football enthusiasts choose to stay home amidst comfortable surroundings and hear the big games, rather than risk failure to get seats, or inclement weather. Above is pictured one of the new Crosley radio models, while below is a Majestic dealer's window display capitalizing on the lure of the gridiron.

Majestic Official Tells Dealer Problems

By Duane Wanamaker
Vice-President, Grigsby-Grunow Co.

RADIO sets should be an ideal companion line for electric refrigeration. Both of them are specialties—both of them appeal to householders as a home necessity and both of them entail securing the interest of husband and wife, as a rule, before the purchase is consummated.

Radio and refrigeration must be sold on the installment plan, as the average family cannot afford to pay cash. Therefore it can readily be appreciated that the fundamentals in both instances are, without question, the same.

Of course, the big thing is that refrigeration is primarily a summer proposition, whereas radio is primarily a fall and winter seller. However, this statement should be qualified considerably.

It is very interesting to note that over a period of two years, radio selling conditions have changed a lot.

Radio sets are better than they used to be—they perform better in summer time—give clearer reception as science has improved them, getting greater distance, etc., and the result has been that sales have gradually improved in the summer.

Necessity

Another thing, radio has come to be accepted as more of a necessity than it used to be. In the beginning, radio was a vaudeville show, more or less of a novelty and it was played up as such.

Now there are so many important communications sent out over the air that even though a person intended to be away a lot in the summer time, he would want a radio set in his home if only to get a half-dozen important programs such as, for instance, educational programs which might help his children in a summer course of study.

In connection with this statement, perhaps a prediction would not be out of the way—that refrigeration has already shown signs of improvement, has good sale in the winter time and there is no question but that as people get more accustomed to hearing of the benefits of having adequate refrigeration in the cool months and, as more propaganda is put out for the purpose of pointing out actual necessity of proper home refrigeration, electric refrigerators will show a continual increase in their salability during the winter season.

Year-Round Appeal

Beyond question, refrigeration and radio combine a year-round selling appeal that should provide the average dealer with a steady, profitable business from January to December.

Refrigerator dealers starting in the radio business today can profit by the mistakes of dealers who pioneered in radio selling. To profit by them, of course, he must avoid them.

Furthermore, the dealer who starts the handling of radio today has a better class of merchandise to deal with, a better class of manufacturers to buy from, and there is much less liability than formerly that he will wake up some morning and have a bunch of "orphans" on his hands which were made to sell at a price of, let us say, $150.00, but which, due to sudden changes of style or difficulties of the manufacturer, are now worth, so far as the public is concerned, only about $75.00.

Actual experience has proved that it is wise to carry only one or at the most a couple of good lines of radio sets. Again let us remember that radio is a specialty line.

Let us remember also that while radio sets may have fundamental points of difference, to the naked eye of the average customer a good radio set is just a good radio set.

If the dealer is carrying a half-dozen makes of good sets, all priced about the same, how can he consistently lead a customer from one set to another and make comparisons without tearing down his belief in the fact that a certain set has real superior points of performance as compared with another one?

Showing a customer a half-dozen sets which look alike to the naked eye and sound alike to the average ear, will only bring confusion and delay in the customer making up his mind.

Handle One Line

It is far better to handle one good line of radio, to be well informed on the talking points of that line and be able to justify the claim that it is superior to all other sets.

Beyond all this, however, the important thing to remember is that radio, being a specialty, has to be advertised in the newspapers and promoted intensively through window displays and other means. When a dealer handles five or six lines, his cost of promotion mounts rapidly and he will likely find himself spending all of his money trying to get a smooth volume of business on the five or six lines.

On the other hand, if he stuck to one good line, put all his efforts behind it, he could probably work up a large volume, at the same time keeping his overhead expense down and making a nice profit.

Through national advertising, people have been taught to pay a great deal of attention to the reputation of the manufacturer of radio and to trust a good deal to this factor in buying a set.

Furthermore, the manufacturer who has the most sets out among the public naturally has the "edge" because if the set is any good, it is its own constant advertisement. Therefore, in selecting a line of radio, a dealer should look well to two things:

1. Reputation of the manufacturer.
2. How many sets has he already sold to the public.

Demonstrations

It is imperative today, if a dealer wants to get a good volume of business, to give house-to-house demonstrations. It is well to remember that the radio business is much more competitive than is the refrigerator business.

The dealer who is content to take on a radio line, do a little advertising and, because the line is prominent, feel he will get a natural flood of business, is going to be very much surprised to find that things are not coming along just as he expected. While he is sitting at his desk in the back of his store, waiting for customers to come in and admire his radio sets, the electrical or hardware or music or some other type of dealer selling radio, has a crew of men out calling house to house and putting out his radio sets on demonstration.

There are innumerable ways to do house to house business successfully. The fundamental is simple and that is to simply put a crew of people out calling on every house in town and asking for the opportunity of installing a radio set on trial.

There is no question about the fact that today everybody craves a good radio set. There are still thousands and thousands of homes that have no radio set at all. Thousands of other homes have old sets that will be traded in for a modest sum. So you can see that the field is there. Sales can be made if you go out after them.

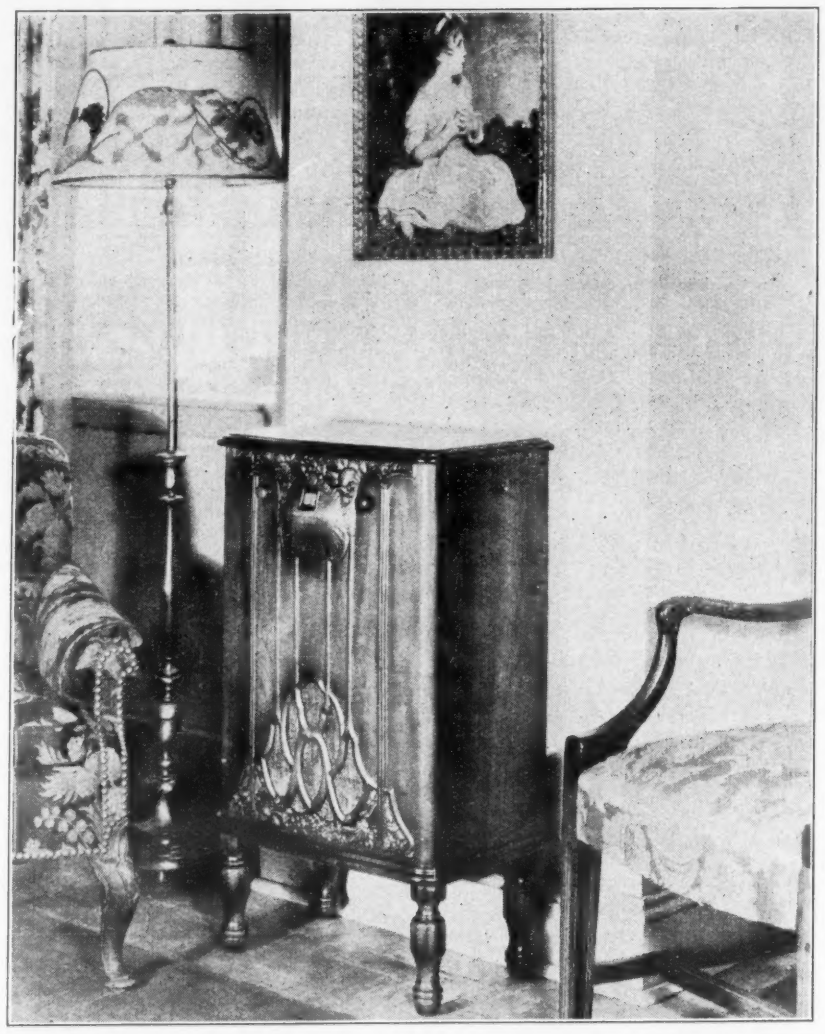
Artistic Store

You cannot sell a radio set like you would a table, bookcase or some other piece of furniture. Another thing, because radio is a proposition involving intrinsic worth, proper merchandising requires a store with some artistic qualities. The store should be clean, neat and some effort should be made to dress up the demonstration of the sets. Remember that a radio set is going into the living room of the average home and the prospect pictures it that way. If she sees it in your store, up against a bare plastered wall or backed up against a refrigerator, it loses all of its intrinsic appeal. Then it is simply a contraption and not a representative of beautiful music, dramas, etc.

Summing the whole matter up, the refrigeration dealer entering into radio merchandising must realize that the most intensive personal efforts must be put behind radio selling.

There is plenty of business to be had, but frankly it is highly competitive business, not from a price standpoint so much, but from the standpoint of getting the customer's attention. Therefore to get radio business it is absolutely necessary to go out after it hard.

Attractive



The modern radio is becoming more and more an atttractive piece of furniture, as well as a mechanism for "getting Cuba" and hearing the President's inaugural address. Above is pictured the General Electric studio lowboy, posing gracefully in comfortable surroundings.

Crosley Predicts New Industrial Era

(Concluded from Page 1, Column 3)

day. Our production has gone up nearly 100% in the past month.

"That the public is imbued with the idea of economy and careful analysis of values before purchasing is best illustrated by the fact that Ford and Chevrolet have this year sold almost 75 per cent of the new automobiles sold.

"Manufacturers in all lines who provide attractive, well-made merchandise at prices people can afford to pay, should have a satisfactory year."

Ann Arbor Dealer Sells Three Home Devices

(Concluded from Page 1, Column 4)

franchise. He has been handling it ever since.

Three years ago, after the Claire radio business had grown so rapidly that the firm was able to institute a second shop in Ann Arbor, the Kelvinator line was added.

Last year the Bosch radio joined the ranks of specialty merchandise in the Claire stores. Recently, Maytag electric washing machines and Apex washers and ironers have entered the fold.

According to the Claire Company's star salesman, Roy Mayer, the selling of electric refrigerators, radios and washing machines is a task which is not one whit harder than selling just one specialty product alone. In fact, says Mr. Mayer, his job has been made easier by the fact that he has more than one item in his bag.

"Often I call on a prospect for refrigeration," says Mr. Mayer, "and find that she is all set for a washing machine, or that she'd like a new radio. And after I've sold a prospect one article, he or she is generally so well satisfied that the sale of the next one is easy.

"Our sales volume naturally varies a bit from time to time, but we have no particular seasonal slumps or peaks. Before we took on the Kelvinator, our summer sales dwindled badly; but now the sale of both radios and refrigerators keeps us going all the time.

"Washing machines fill up the gaps between the seasons of strong demand for the former two products, and help even up the load."

Wextark Store Displays Companion Products

Effective presentation of radios and refrigerators in Detroit shop during recent radio show.

How to Place Radio Loud Speaker in Every Room

By P. K. Dunning

AS the habit becomes more fixed, the practice of having loud speakers in various rooms in the house is becoming increasingly general. Most standard receiving sets made today will operate successfully from two to twelve separate speakers, which can be situated in any part of the house.

There are practical devices on the market which permit remote control of the receiver in the living room and bedroom, for instance, can be switched on for the morning exercise without any necessity for going downstairs to the receiver in the living room and without starting the speakers in any other part of the house.

More elaborate and expensive devices enable you to press a button and not only start the radio but, through other controls, to tune in on any desired station. With things going as they are it won't be long now before your home will be wired for radio just as it is for light.

Wiring Simple

Radio wiring is a simple and relatively inexpensive matter. Ideally, it should be done while the house is in the process of construction. Then you have rigid conduit raceways running from the living room or wherever the main receiving set is placed, to the dining room, recreation room, bed room, kitchen, servants' quarters and so on.

Rigid conduit is advisable for conducting radio wires because it shields the radio wiring system from interference by other electrical currents running through the house.

Where these channels are brought to the surface of the wall in each room they come to what is called an "outlet box." Because most radio sets and many loud speakers are now electrically operated this outlet box should be situated near a duplex convenience outlet of the regular electric light system.

The aerial may be installed in the attic, or if one wants long distance reception, outdoors. From the end of the aerial a wire is brought down through the walls to the outlet plate in the room where the receiver is to be situated.

Ground Connection

The ground connection is made within the outlet box itself. A wire is merely connected to the conduit raceway that carries the radio connection to the various parts of the house and, at some convenient point, a ground clamp is used to connect this conduit to a water pipe, the most effective ground connection known.

The standard receiving set at present has three connections which must be made—one for power from the house lighting circuit, one for the aerial and one for the ground. With the system just described these three sets of wires are plugged into the outlet plate and the radio is ready to operate.

The loud speakers may be rapidly connected to the outlet boxes in the various rooms and any desired system of local or remote controls provided to suit your fancy or your needs. It is not necessary to install all the loud speakers at once.

Once the wiring job is done the outlet boxes may be faced over and left until such time as they will be needed—but it is an economical plan to have the complete wiring job done at once.

G. E. Inaugurates Service Check-Up Plan

Cleveland, Ohio.—Realizing the desirability of supplementing factory inspection of radio sets by an after-sale performance check-up, the General Electric Co. has adopted a plan by which at least one dealer service call is assured to each purchaser, without at the same time placing an undue burden on the dealer.

Packed with each set is a request for a certified inspection warrant and a guarantee certificate. After installation of the set, the purchaser fills in the request card and sends it in. The purchaser then receives direct from the company the guarantee certificate and, shortly before the expiration of the 90-day guarantee period, the certified inspection warrant.

At the end of 90 days, a personal call is made by the dealer's representative to ascertain that the purchaser is satisfied with the operation of the set and the service he has received. If the purchaser is entirely satisfied, he will sign the certified inspection warrant and surrender it to the dealer, who, in turn, will submit the signed warrant to his distributor, from whom he will receive a merchandise credit in accordance with type of set involved.

DIRECTORY OF RADIO MANUFACTURERS

LIST OF CONCERNS MAKING COMPLETE RECEIVING SETS

A-C Dayton Co.
300 E. First St., Dayton, Ohio

Acme Apparatus Co.
37 Osborn St., Cambridge, Mass.

Acme Electric & Mfg. Co.
1440 Hamilton, Cleveland, Ohio

Adrola Corp.
Port Jefferson, N. Y.

Aero Products, Inc.
4611 Ravenswood, Chicago, Ill.

Ajax Electric Supply Co.
1926 Chestnut, St. Louis, Mo.

All-American Mohawk Corp.
North Tonawanda, N. Y.

American Bosch Magneto Corp.
Springfield, Mass.

American Reproducer Corp.
1204 Summit Ave., Jersey City, N. J.

Amplex Instrument Laboratories
132 W. 21st St., New York, N. Y.

Amplion Radio Corp.
133 W. 21st St., New York, N. Y.

Amrad Corp.
Colerain and Sassafras, Cincinnati, Ohio

F. A. D. Andrea, Inc.
Long Island City, N. Y.

Anylite Electric Co.
Fort Wayne, Ind.

Apex Electric Mfg. Co.
1410 W. 59th, Chicago, Ill.

Atwater-Kent Mfg. Co.
4700 Wissahickon Ave., Philadelphia, Pa.

Audiola Radio Co.
430 S. Green St., Chicago, Ill.

Automatic Radio Mfg. Co., Inc.
332 A St., Boston, Mass.

Automatic Saw Guide & Machine Co.
Irwin, Pa.

Nathaniel Baldwin, Inc.
Salt Lake City, Utah

Balkeit Radio Co.
North Chicago, Ill.

Best Mfg. Co.
Irvington, N. J.

Bethlehem Radio Corp.
Bethlehem, Pa.

Bremer-Tully Mfg. Co.
Kalamazoo, Mich.

Brenard Mfg. Co.
Iowa City, Iowa

Brooklyn Metal Stamping Corp.
718 Atlantic Ave., Brooklyn, N. Y.

Browning-Drake Corp.
110 Brookline St., Cambridge, Mass.

Brunswick-Balke-Collender Co.
623 So. Wabash Ave., Chicago, Ill.

Brunswick Radio Corp.
116 W. 42nd St., New York, N. Y.

Brush Pottery Co.
Zanesville, Ohio

J. H. Bunnell & Co.
32 Park Place, New York, N. Y.

Bush & Lane Piano Co.
Holland, Mich.

Allen D. Cardwell Mfg. Co.
81 Prospect, Brooklyn, N. Y.

Case Electric Co.
Marion, Ind.

Chelton Electric Co.
Stenton Ave. and Rockland, Philadelphia, Pa.

Chicago Radio Apparatus Co., Inc.
415 S. Dearborn St., Chicago, Ill.

Colonial Radio Corp.
25 Wilbur Ave., Long Island City, N. Y.

Columbia Phonograph Co., Inc.
1819 Broadway, New York, N. Y.

Columbia Radio Corp.
711 W. Lake, Chicago, Ill.

Crescent Radio Mfg. Co.
1026 2nd Ave., Minneapolis, Minn.

Crosley Radio Corp.
Colerain and Sassafras, Cincinnati, Ohio

Custer Specialty Co.
Dayton, Ohio

Davis Industries, Inc.
Kokomo, Ind.

De Forest Radio Co.
139 Franklin, Jersey City, N. J.

Thomas A. Edison, Inc.
W. Orange, N. J.

Electric Machine Co.
520 S. New Jersey, Indianapolis, Ind.

Electric Products Mfg. Co.
69 Sprague, Providence, R. I.

Electric Specialty Co.
218 South St., Stamford, Conn.

Electrical Industries Mfg. Co., Inc.
328 W. 41st St., New York, N. Y.

Electrical Research Laboratories
2500 Cottage Grove Ave., Chicago, Ill.

Emerson Radio & Phonograph Corp.
309 6th Ave., New York, N. Y.

Empire Electric Mfg. Co.
25 E. Juneau Ave., Milwaukee, Wis.

Federal Radio Co.
1738 Elmwood Ave., Buffalo, N. Y.

Federal Telegraph Co.
625 Market St., San Francisco, Cal.

Ford Radio & Mica Corp.
109 Bleecker St., New York, N. Y.

French, Jesse & Sons Piano Co.
New Castle, Ind.

Genrhart Radio Corp.
Fresno, Cal.

Hartman Electrical Mfg. Co.
Mansfield, Ohio

Hawkeye Radio Co.
Cedar Rapids, Ia.

Howard Radio Co.
South Haven, Mich.

Howe Auto Products Co.
Crystal Lake, Ill.

Jubilee Mfg. Co.
Omaha, Neb.

Kellogg Switchboard & Supply Co.
1066 W. Adams, Chicago, Ill.

Kelster Radio Corp.
200 Mt. Pleasant Ave., Newark, N. J.

Colin B. Kennedy Corp.
South Bend, Ind.

Keystone Radio Laboratories, Inc.
129 N. Jefferson Ave., Chicago, Ill.

King Mfg. Co.
254 Bano, Buffalo, N. Y.

National Transformer & Radio Mfg. Co.
5100 Ravenswood Ave., Chicago, Ill.

I. B. Nelson Co.
1 Bend, Newark, N. J.

Newman-Stern Co.
1740 E. 12th, Cleveland, Ohio

Operadio Mfg. Co.
St. Charles, Ill.

Ozarka, Inc.
122 W. Austin Ave., Chicago, Ill.

Panama Rubber & Equipment Co.
3325 Lindell Blvd., St. Louis, Mo.

Penna Radio Mfg. Co.
New Castle, Pa.

Philadelphia Storage Battery Co.
Ontario & C Sts., Philadelphia, Pa.

Philmore Mfg. Co.
106 7th Ave., New York, N. Y.

Pierce-Airo, Inc.
113 Fourth Ave., New York, N. Y.

E. S. Ritchie & Sons
Brookline, Mass.

Robbins & Myers, Inc.
Lagonda Ave. and R. R., Springfield, O.

Robbins Radio Co.
71 Dey, New York, N. Y.

Robertson-Davis Co., Inc.
361 W. Superior, Chicago, Ill.

Roller-Smith Co.
10 Park Place, New York, N. Y.

Roth-Downs Mfg. Co.
2512 University Ave., St. Paul, Minn.

Schmelzer Co.
1012 Grand Ave., Kansas City, Mo.

Sears-Roebuck & Co., Inc.
Arthington and Homan Aves., Chicago, Ill.

Silver-Marshall, Inc.
6401 W. 75th St., Chicago, Ill.

Simmons Mfg. Co.
3405 Perkins Ave., Cleveland, Ohio

Simplex Radio Co.
Rector St., W. of Main St., Philadelphia, Pa.

Sparks, Withington Co.
Jackson, Mich.

Splitdorf Radio Corp.
98 Warren, Newark, N. J.

Standard Radio Corp.
Worchester, Mass.

Stanley & Patterson,
150 Varick, New York, N. Y.

Steinite Radio Co.
Fort Wayne, Ind.

Sterling Mfg. Co.
2831 Prospect Ave., Cleveland, Ohio

Stewart-Warner Speedometer Corp.
1826 Diversey Blvd., Chicago, Ill.

Story & Clark Radio Co.
173 N. Michigan Ave., Chicago, Ill.

Stromberg-Carlson Telephone Mfg. Co.
Carlson Road, Rochester, N. Y.

Telephone Maintenance Co.
123 S. Wells, Chicago, Ill.

Thordarsen Electric Mfg. Co.
500 W. Huron, Chicago, Ill.

Transformer Corp. of America
Chicago, Ill.

Trav-Ler Mfg. Co.
St. Louis, Mo.

Trego Radio Mfg. Co.
1427 Chestnut, Kansas City, Mo.

Triangle Electric Co.
600 W. Adams, Chicago, Ill.

Ufonic Radio Corp., Ltd.
Hollywood, Cal.

United Air Cleaner Corp.
9705 Cottage Grove Ave., Chicago, Ill.

United Reproducers Corp.
25 Leighton Ave., Rochester, N. Y.

U. S. Radio & Television Corp.
1340 So. Michigan Ave., Chicago, Ill.

Victoreen Radio Co.
Cleveland, Ohio

Voltamp Electric Mfg. Co.
511 W. Franklin Ave., Baltimore, Md.

Wakem & McLaughlin, Inc.
225 East Illinois, Chicago, Ill.

Walbert Mfg. Co.
1000 Fullerton Ave., Chicago, Ill.

Washburn Mfg. Co.
Kokomo, Ind.

Washmuth-Goodrich Co.
Peru, Ind.

Wayne Paper Goods Co.
Fort Wayne, Ind.

Wells-Gardner & Co.
816 N. Kedzie Ave., Chicago, Ill.

Wells Mfg. Co.
Fond du Lac, Wis.

Wenzelmann Mfg. Co.
Gallesburg, Ill.

Western Coil & Electrical Co.
Racine, Wis.

Western Radio Mfg. Co.
128 W. Lake, Chicago, Ill.

Westinghouse Electric & Mfg. Co.
New York, N. Y.

Wilcox Laboratories, Inc.
Charlotte, Mich.

Workrite Mfg. Co.
1838 E. 30th, Cleveland, Ohio

Yale Corp.
5703 Sunset Blvd., Los Angeles, Cal.

Zenith Radio Corp.
3629 Iron St., Chicago, Ill.

Amos 'n Andy Intrigue Whole Family

Social analysts whose eyes are trained to discern general movements and trends are now predicting that America is returning to its collective homes. From the playhouse and the roadhouse a war-reacting generation is coming back to the abiding joys and peace of the most fundamental of all institutions. Such transitions do not come suddenly. They must have translating media, and connecting links. It is in this capacity that the radio has acted in bringing everybody back home. We have craved amusement—singing and dancing and music and sports—but we like to watch professionals do these things, rather than do them ourselves in our own homes, as our grandparents did. The radio has made it possible to sit at home and listen to opera stars, jazz bands, blues singers, prize fights, baseball and football games, vaudeville stars, political speeches and celebrities of all descriptions. The present generation can hear what it has trained itself to think it wants at home, and thus has been re-educated in the knowledge of home pleasures. For this reason the radio can lay claim to having started a gargantuan swing of society's pendulum.